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MAR 1997 RECEIVED

Date: March 25, 1997
Refer to: EM/ER:97-081

Mr. Benito Garcia
NMED-HRMB
P.O. Box 26110
Santa Fe, NM 87502

SUBJECT: VCM OF TA-16 V-SITE AND BUILDING 27 IN CONJUNCTION WITH D&D ACTIVITIES (FORMER OPERABLE UNIT 1082)

Dear Mr. Garcia:

Enclosed please find the Voluntary Corrective Measures (VCM) Plan for 17 potential release sites (PRSs) located within Technical Area 16 associated with V Site and Building 27. An informational copy of the Voluntary Corrective Action (VCA) Plan for these PRSs was provided to your Bureau on March 13, 1997. We received telephone notification and, ultimately, a letter (dated March 19. 1997) from your Bureau notifying us of your desire to perform this activity as a VCM after the VCA Plan had been submitted. The New Mexico Environment Department Oversight Bureau was provided a draft copy of this plan, and most of their comments were incorporated into the enclosed final document. We plan to start these activities in early April and would appreciate your comments as soon as possible.

The Environmental Restoration Project has scheduled a public dialogue session to discuss this activity and other cleanups. This session will be held on Wednesday, March 26 from 1:00 to 8:00 p.m. at the Los Alamos Outreach Center, 1350 Central Avenue in Los Alamos.

If you have any further questions, please contact Roy Michelotti at (505) (665-7444) or Joe Mose at (505) 667-5808. Thank you for your comments on this cleanup activity.

Sincerely,

Jorg Jansen, Program Manager
LANL/ER Project

Sincerely,

Theodore J. Taylor, Program Manager
DOE/LAAO

JJ/TT/ss

6045

Enclosure: (1) VCM Plan for TA-16 V-Site and Building 27

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Voluntary Corrective Measures Plan for

Potential Release Sites at TA-16

16-005(d)
16-006(g,h)
16-013
16-017
16-025(x)
16-026(q)
16-029(g2, h2,w,x)
16-031(c,d)
16-034(p)
C-16-065
C-16-068
C-16-074

Field Unit 3

Environmental Restoration Project

March 1997

A Department of Energy
Environmental Cleanup Program

Los Alamos
NATIONAL LABORATORY

LA-UR-97-640

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1.0 INTRODUCTION

This plan describes the proposed voluntary corrective measures (VCM) at 17 potential release sites (PRSs): 16-005(d), 16-006(g,h), 16-013, 16-017, 16-025(x), 16-026(q), 16-029(g2,h2,w,x), 16-031(c,d), 16-034(p), C-16-065, C-16-068, and C-16-074, all located at Technical Area 16 (TA-16). This plan also includes characterization of the principal drainage from this area.

These sites are recommended for accelerated cleanup in conjunction with decontamination and decommissioning (D&D) activities scheduled to take place in this area during spring/summer 1997. Coordinating the cleanup of these PRSs with D&D of these facilities will result in significant time and cost savings. In addition, cleaning up the sites during D&D will maximize the ability to thoroughly remove potential contamination instead of contamination being obscured or dispersed by D&D activities.

PRS 16-013 is listed in Table A of the Hazardous and Solid Waste Amendments (HSWA) Module of Los Alamos National Laboratory's (LANL's) Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit (EPA 1990, 0306). The rest of the PRSs addressed in this plan are listed in Table C of the HSWA Module.

The location of TA-16 relative to all Los Alamos National Laboratory technical areas is shown in Figure 1.0-1. Figure 1.0-2 shows the location of the TA-16 areas to be remediated in this plan with respect to each other. The areas consist of PRSs associated with high explosives (HE) processing activities at former TA-25 (V-Site), as well as PRSs associated with TA-16-100 and PRSs associated with TA-16-27. PRSs 16-006(g,h), 16-013, 16-025(x), 16-029(g2,w,x), 16-031(c), C-16-068, and C-16-074 are located in the vicinity of V-Site. PRSs 16-005(d), 16-026(q), 16-031(d), and C-16-065 are located in the area surrounding TA-16-27. PRS 16-017 is associated with all the building footprints, including those at V-Site and TA-16-27, as well as TA-16-10, which is located west of TA-16-27. PRS 16-029(h2) is a drain line between V-Site and TA-16-27. PRS 16-034(p) is the remains of a former WWII structure, TA-16-41, which is located 250 ft south of building TA-16-27.

Table 1.0-1 lists each PRS in numerical order, its description, the area in which it is located, and the section of the RCRA Facility Investigation (RFI) Work Plan for Operable Unit (OU) 1082 in which each was originally described (LANL 1993, 1094).

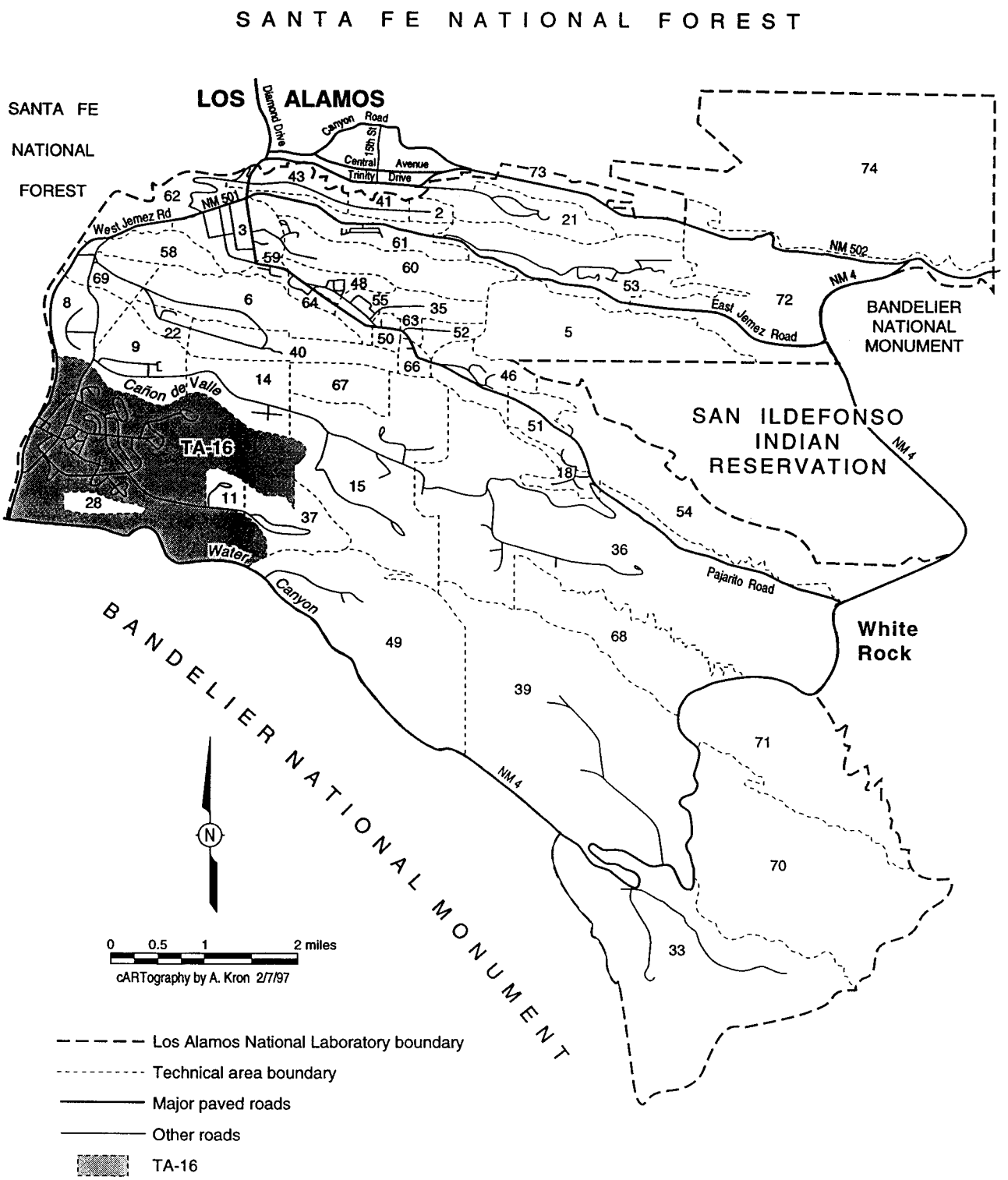


Figure 1.0-1. Location of TA-16 with respect to other Laboratory technical areas and surrounding landholdings.

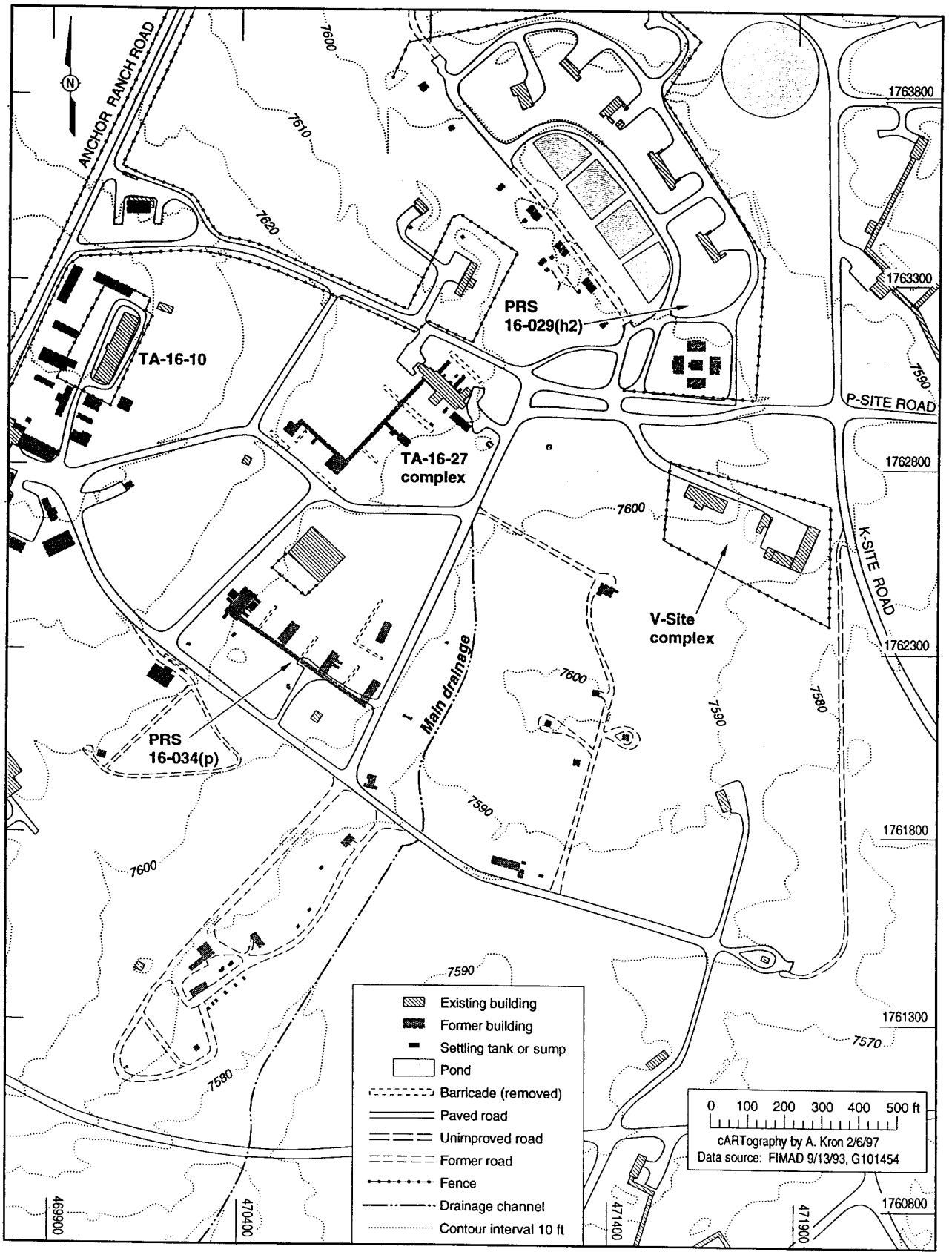


Figure 1.0-2. Location of areas included in this VCA plan.

TABLE 1.0-1
SUMMARY OF PRSs IN THIS VCM PLAN

PRS	DESCRIPTION	LOCATION	WORK PLAN REFERENCE
16-005(d)	Septic tank TA-16-177, served TA-16-27	Near TA-16-27	5.18
16-006(g)	Septic tank TA-16-527, served TA-16-515	V-Site	5.25
16-006(h)	Pump pit TA-16-526	V-Site	6.4.1.1
16-013	V-Site courtyard storage area	V-Site	5.17
16-017	Building foundations and structures	V-Site and near TA-16-27	6.4.1.1
16-025(x)	Electroplating laboratory, TA-16-100	V-Site	5.25
16-026(q)	TA-16-27 sumps and drainages	Near TA-16-27	5.18
16-029(g2)	Pit TA-16-523	V-Site	6.4.1.1
16-029(h2)	Drain line for TA-16-95, -96, -97, -98	Between V-Site and TA-16-27	5.18
16-029(w)	TA-16-100 sump	V-Site	5.25
16-029(x)	TA-16-515 sump and drainline	V-Site	5.25
16-031(c)	Cooling tower for TA-16-515	V-Site	5.25
16-031(d)	Cooling tower for TA-16-28	Near TA-16-27	5.19
16-034(p)	TA-16-41 foundation	South of TA-16-27	5.19
C-16-065	Drum storage platform, TA-16-185	Near TA-16-27	5.19
C-16-068	Laboratory, TA-16-522	V-Site	5.25
C-16-074	Drum storage area, TA-16-517	V-Site	5.25
Main drainage	Main World War II–era S-Site drainage channel	Between V-Site and TA-16-27	5.18 and 5.20

These PRSs have been aggregated in this VCM Plan because the structures associated with the PRSs are scheduled for D&D in spring/summer 1997. In addition, the VCM is facilitated because of the geographic proximity and similarity of historical activities at these PRSs. Therefore, all the PRSs are appropriate for an accelerated approach to cleanup.

D&D activities will remove all aboveground and underground structures, including sumps and septic systems. No soil will be removed during D&D activity by the D&D contractor, other than incidental amounts associated with removal of structures and debris. All soil sampling and removal will be conducted by the Environmental Restoration (ER) Project Field Unit (FU) 3 contractor during the VCM of the PRSs. The purpose of this plan is to describe the technical approach to sampling and removal of contaminated soil, as necessary, from these PRSs. Again, the coordination of D&D with VCM activities is crucial and will result in a significant time and cost savings to the cleanup of these sites.

1.1 Site Types and Description

1.1.1 Physical Setting and Site Descriptions

V-Site is located at TA-16 in the southwest corner of the intersection of K-Site Road and P-Site Road, at the eastern edge of the old World War II–era complex (Figure 1.0-2). The site is wooded, level, and fenced. A paved road leads 250 ft to an approximately 6 000-ft^2 paved courtyard. Six dilapidated buildings occupy V-Site; entry to five buildings is prohibited for safety reasons, and the sixth is a storage shed that is open on one side. Runoff trends to the southeast at this site. The road and courtyard drain into a small ditch north of the road, which leads to a ditch west of K-Site Road.

TA-16-27 is located approximately 800 ft west of V-Site (Figure 1.0-2). The area is relatively level, sloping less than 10 ft from north to south and roughly 20 ft from west to east. The primary drainage in this region is eastward to a north-south ditch (known as the main drainage, also discussed in this plan) that empties into a tributary of Water Canyon roughly 0.25 miles south of the World War II–era S-Site complex.

1.1.1.1 V-Site PRSs

Individual PRSs in the V-Site area are described as follows. PRS locations are shown on Figure 1.1.1.1-1.

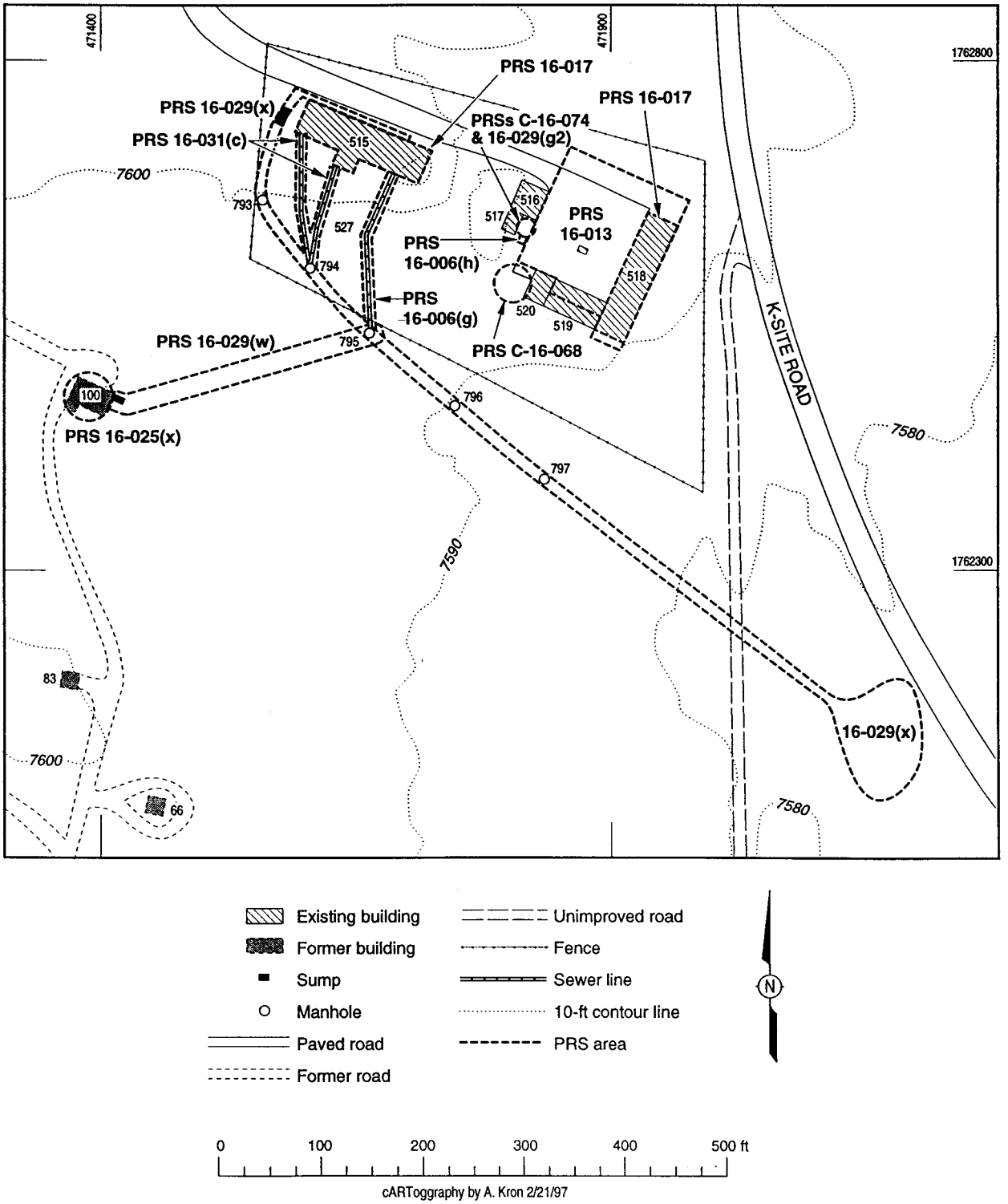


Figure 1.1.1.1-1. Location of PRSs at V-Site.

PRS 16-006(g) is septic tank TA-16-527, located in a level, wooded area about 50 ft south of TA-16-515. The tank is 6 ft long x 10 ft wide x 4.5 ft deep, has a capacity of 1 500 gal., and is constructed of reinforced concrete with a wooden cover. The septic tank is still in place. Engineering drawing ENG-C 6031 indicates that the septic tank was connected by a 4-in. vitreous clay pipe to sinks and toilets at the southeast corner of TA-16-515 and that the system did not serve any of the HE processing areas in the building. Drawing ENG-C 6028 indicates that effluent from the tank discharged to the outfall line from sump PRS 16-029(x) at manhole TA-16-795.

PRS 16-006(h) is a steam-heating distribution pump pit, TA-16-526. This structure is located approximately 12 ft southeast of TA-16-517 (LANL 1990, 0145). The 6 x 6 x 6 ft pit was built in 1945 to hold a condensate pump. Condensate from the TA-16-517 boilers, as well as from the S-Site area, was routed through this pit to be returned to the source boiler. This system served TA-16-515, TA-16-516, TA-16-519, and TA-16-520. Some pipes in the pit are insulated with asbestos.

PRS 16-013 is the storage area located in the courtyard that is formed by TA-16-516, TA-16-517, TA-16-518, TA-16-519, and TA-16-520. The north side of the courtyard is open to a level, grassy field. The area was used for drum storage for an unknown duration prior to 1993 (LANL 1993, 1094).

PRS 16-025(x) contains potentially contaminated soil associated with electroplating laboratory TA-16-100, which was located about 400 ft southwest of V-Site in a level field (the building was destroyed by intentional burning in 1960). A former site worker suggests that HE charges were directly electroplated here (Martin and Hickmott 1993, 15-16-498). Engineering drawing ENG-C 596 indicates that this wood-frame building was 25 ft long x 33 ft wide, contained a utility room and a work room, and was set on concrete piers.

PRS 16-029(g2) was pit TA-16-523. Engineering drawing ENG-C 1837 indicates that it was an 11 ft x 16 ft x 4 ft concrete structure located directly to the east of TA-16-517. The pit was built in 1944, but abandoned in place in 1945. It is filled with dirt and covered with a concrete slab. The pit held a remotely controlled vibration table used for shake tests of the Fat Man device. No radioactive materials were used in this pit and no incidents occurred here. A 1983 memo indicates that HE and beryllium were used at TA-16-523 (Blackwell 1983, 15-16-076).

PRS 16-029(w) contains potentially contaminated soil associated with a 6.3 ft long x 14 ft wide HE sump located on the east side of TA-16-100. It drained via a 4-in. pipe to manhole TA-16-795 and then to the outfall of the V-Site system [PRS 16-029(x)].

PRS 16-029(x) is associated with the inactive HE sump from floor troughs in building TA-16-515. Engineering drawing ENG-C 6030 indicates that effluent flowed from two work areas inside the building to an open trough under the north porch. ENG-C 6028 shows that effluent flowed through a drop inlet and then through an underground 6-in. vitreous clay pipe to the sump west of the building. The 4 x 11 x 4 ft sump contains three chambers. The first was fitted with a wire catch basket. Outflow from the final chamber went through a standpipe inlet 2 ft above the bottom of the sump and then into a 6-in. vitreous clay drain pipe. Site map ENG-C 6028 indicates that drains from the darkroom and the utility room in TA-16-515 entered the system within 50 ft of the sump. From the sump, a 6-in. vitreous clay pipe led through seven manholes to daylight about 800 ft southeast of V-Site. Branch lines from septic tank TA-16-527, PRS 16-006(g), and laboratory building TA-16-100 entered the system at manhole TA-16-795. Photographs from the 1960s indicate that portions of the drain line were removed. Recent site visits suggest some of the pipe remains. The entire system drained into a low, level swale, then into a drainage ditch beside K-Site Road. These drainage areas are considered to be part of the PRS.

PRS 16-031(c) is described in the SWMU Report as an inactive cooling tower for building TA-16-515 (LANL 1990, 0145). There are no indications on engineering drawings or aerial photographs that the building ever housed a cooling tower. Former employees deny that a cooling tower was ever associated with the building (Martin 1993, 15-16-477; Martin and Hickmott 1993, 15-16-497). Engineering drawings indicate that all effluent from the building entered the drain system described for PRS 16-029(x). Thus, any potential contamination from this PRS will be discovered through the analyses done for 16-029(x).

C-16-068 is associated with the site of former building TA-16-522. The Release Site database suggests that TA-16-522 was constructed in 1944 and removed in 1945. This building has not been located on any existing drawings or photographs. Interviews with early site workers have not provided any information about the building. An unidentified foundation west of TA-16-519 may be the former site of this building. A former site worker suggests that TA-16-522 was contaminated with beryllium (Blackwell 1983, 15-16-076).

C-16-074 is associated with a drum storage area located on the concrete pad east of TA-16-517. The pad is level, empty, and surrounded by the asphalt paving of the adjacent courtyard. V-Site was used for many years as a general storage area for TA-16; however, no oil stains are present. Only a few rust rings remain on the concrete pad. Drainage flows north around TA-16-516 to a ditch leading east to the ditch along K-Site Road. The SWMU Report states that drums containing HE-contaminated hydraulic oil were stored in this location (LANL 1990, 0145).

1.1.1.2 Building 27 PRSs

Individual PRSs in the area of building TA-16-27 are described as follows. PRS locations are shown in Figure 1.1.1.2-1.

PRS 16-005(d) is septic tank TA-16-177 and its drain line. TA-16-177 served lavatories in TA-16-27. The septic tank was constructed of reinforced concrete and had a wooden cover. It discharged to a 6-in. vitreous clay pipe located southeast of the tank (engineering drawing ENG-R 289). TA-16-27 is highly contaminated; thus, it is likely that the septic tank is also contaminated. It is also likely that the tank itself was removed.

PRS 16-026(q) contains surface and subsurface soil associated with the sumps, drain lines, and inactive outfalls for TA-16-27. TA-16-27 is a large (roughly 150 ft long x 50 ft wide) wood-frame building with a concrete foundation, concrete floor, and a large basement that contains a sump, vacuum pumps, and other equipment. The building consists of a 39 ft x 89 ft central casting room and several smaller rooms that were used as laboratories and offices. An associated equipment building to the south of the main building is also considered to be part of TA-16-27. The main casting room was fitted with over 20 casting stations, each of which had temperature-controlled water outlets. Overhead ductwork provided ventilation to the casting room. Some of this ductwork remains and contains recrystallized HE (Martin 1993, 15-16-477; Martin and Hickmott 1993, 15-16-497). Based on examination of World War II–era photographs (LASL photo circa 1946, 3083), there appear to have been five 600-lb casting kettles in the building.

TA-16-27 was originally constructed with four sumps. The north and south sides of the building each had one primary sump adjacent to the building. These sumps were connected to secondary sumps located a few feet from the building. In the early 1950s, these four sumps were removed and five new primary sumps were constructed: two on the north side of the building and three on the south side of the building. Both the north set of sumps and the south set of sumps fed secondary sumps located more than 50 ft from the building. All sumps were reportedly removed from the site in the 1960s. The drain lines from both secondary sumps flowed eastward in rock-lined ditches to a ditch that flowed south along the roadway, under the road corner, and into the main drainage of the World War II–era S-Site. TA-16-27 is currently empty and in a severe state of disrepair.

PRS 16-031(d) is associated with decommissioned cooling tower TA-16-28. This cooling tower was located approximately 70 ft south of TA-16-27. Currently the site of the tower is level. The cooling tower was of wood-frame construction and measured 28 x 28 x 46 ft. The tower

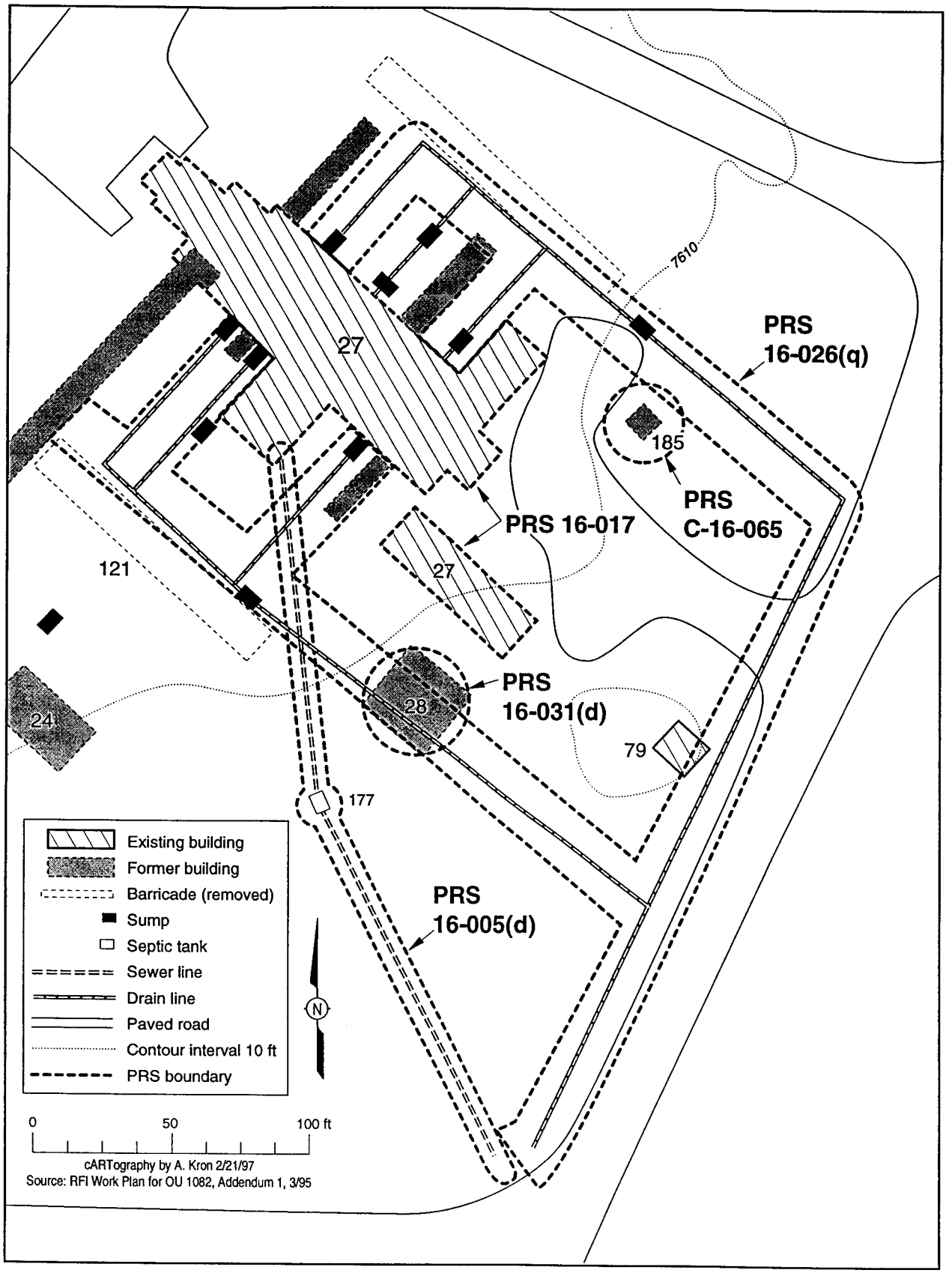


Figure 1.1.1.2-1. Location of PRSs at TA-16-27.

stored water for the cooling jackets used in casting at TA-16-27. It is not known if chromates were used in the cooling system. TA-16-28 was built in 1945 and demolished by intentional burning in 1968. There is no record of contamination surveys that may have been conducted prior to, or since, demolition.

C-16-065 is potential soil contamination associated with drum storage platform TA-16-185. The platform was used to store drums of HE-contaminated waste from the nearby HE processing buildings. This structure was a concrete platform with dimensions of 13.5 x 8.7 x 4.5 ft. It was located approximately 50 ft east of TA-16-27. It was built in 1948 and abandoned in place in 1960. It was probably removed in 1968, concurrently with the D&D of nearby buildings.

1.1.1.3 Remaining PRSs

The locations of the remaining PRSs (except PRS 16-017) to be addressed in this VCM Plan were shown in Figure 1.0-2. These PRSs are described as follows:

PRS 16-017 is a group of 23 intact, abandoned structures in, or closely associated with, the World War II–era S-Site complex. Some of these buildings have been decommissioned and removed. The structures associated with TA-16-10, TA-16-27, TA-16-515, TA-16-516, TA-16-519, and TA-16-520 are part of this VCM Plan and are scheduled for D&D in the spring/summer of 1997. Only this subset of structures will be discussed in this plan. All other structures associated with this PRS have already been characterized, sampled, and removed. These are the last structures associated with this PRS.

PRS 16-029(h2) is the drain line from TA-16-95, -96, -97, -98 (also called West, North, East, and South). These were HE machining buildings with sumps that lead to a drain line located approximately 600 ft east of TA-16-27 and 400 ft north of V-Site. The sumps and the soil surrounding the buildings are associated with other PRSs. The drain line almost encircles the group of buildings before connecting to manhole TA-16-801 and draining directly north. The buildings were destroyed by intentional burning in 1960. It is not known how much of the drain pipe was removed at that time. An HE-filled pipe associated with this PRS was found during D&D and VCA activities of the 90s Line area in 1996. The length of remaining pipe is unknown. D&D will remove the existing pipe.

PRS 16-034(p) includes the basement foundation of TA-16-41 as well as associated soil that may be contaminated. TA-16-41 originally provided office space to serve other buildings in the area. It also served as a laboratory and may have been used to store compressors. In 1962 the building was removed and the basement was used for an incinerator (PRS 16-011). The

incinerator portion of the structure was removed during a VCA in 1995 (LANL 1996). All that remains at this site is the basement foundation, which will be removed using the heavy equipment deployed at V-Site.

Main drainage is not a designated PRS; however, it serves as the main drainage channel for a large number of PRSs at S-Site, including many of the PRSs in this plan. Because it drains the runoff from several of these VCM sites, it is included in this plan for characterization and potential remediation, if contaminated.

1.1.2 Operational History of V-Site and TA-16-27

The history and operations at V-Site and at TA-16-27 differ slightly and are individually described below.

V-Site was constructed in 1944 for handling, loading, shake-testing, and cold-testing of mockups of the atomic bomb known as Fat Man. A mockup of a B-29 bomb bay was erected at V-Site for these tests (Hawkins 1946, 16-663).

The first structures constructed at the site were TA-16-515 (V-1, V-2) and TA-16-517, a laboratory, all built in 1944. V-Site was expanded in spring 1945 with the construction of TA-16-516, TA-16-519, and TA-16-520. TA-16-519 and TA-16-520 were used for varnishing and assembly of Fat Man mockups. In July 1945, final testing of the fit of the Trinity Device was performed in TA-16-516. At that time, the site was remodeled for non-explosive testing of HE lenses and inner charges of implosion devices, and for final machining work on explosive parts (Truslow 1973, 15-16-264). An x-ray system was installed to inspect explosive charges (Ackerman 1945, 15-16-162).

Drawing ENG-C 1839 suggests that building TA-16-515 was constructed as a warehouse, but that it also housed a shop and small office. By fall 1945, the building was remodeled and made into a laboratory, inspection room, and repair area for HE parts. The laboratory housed an x-ray machine and included a darkroom. Drawing ENG-C 6030 indicates that part of the walls near the x-ray machine were lead-covered; the lead panels are still in place. The inspection and repair room floors were fitted on three sides with lead-lined troughs leading outside to the trough under the porch. The floor drained toward the troughs. Drawing ENG-C 639 indicates that lead was removed from the troughs in 1950. The laboratory area was remodeled again in 1963 for a temperature cycling chamber. Former employees indicate that the building was used for multiple purposes over the years, including assembly and varnishing of HE parts, HE casting, a remotely controlled shake table (Martin 1993, 15-16-477), and storage.

After World War II, the primary operations at V-Site were x-ray work and photoprocessing in the west end of TA-16-515, HE casting in the east end of TA-16-515, pioneering work done on plastic explosives in TA-16-516, and photoprocessing in TA-16-519 and TA-16-520. TA-16-100 was moved from TA-3 to the S-Site complex in 1949 to be used as an electroplating laboratory. TA-16-100 was destroyed by intentional burning in 1960. The sump and drain line were also removed during the 1960s.

All active work at V-Site ceased by 1980. Both the courtyard and shed TA-16-518 were used for general storage until 1993; the rest of the site was abandoned, although the buildings are still standing. Portions of the TA-16-515 drainage system were removed during the late 1960s. The rest of the sump and drainage system at TA-16-515 was scheduled for demolition and restoration programs in 1970, as were manholes TA-16-793, TA-16-794, TA-16-795, TA-16-796, TA-16-797, TA-16-798, and TA-16-799 (Thrap 1970, 15-16-001), but the demolition never occurred. TA-16-515 is now abandoned and deteriorating. Entry is prohibited for safety reasons.

TA-16-27 and surrounding structures were used for HE processing from 1945 to the early 1950s. Construction of TA-16-27 was completed in May 1945. The building was the main production casting facility for S-Site through 1953, when TA-16-300 and TA-16-302 were completed, although casting was stopped temporarily in 1946 due to deterioration of the building. Full-scale lenses for nuclear devices were cast in this building (Ackerman 1945, 15-16-509). During July 1945, casting occurred in three shifts, going on around-the-clock.

After casting operations were moved into the 300-Line in the early 1950s, TA-16-27 was used as a warehouse (Thrap 1970, 15-16-001). The sumps and drain lines for this building were removed in 1968. In 1970, the building was abandoned. At that time, the building was surveyed for radioactive contamination (Buckland 1970, 15-16-005; Kennedy 1970, 15-16-006), chemical contamination (Mitchell 1970, 15-16-007), and HE contamination (Courtright 1970, 15-16-004). One piece of equipment was mildly contaminated with radioactivity, presumably from depleted uranium, and the building itself was extensively contaminated with HE.

1.2 Contaminants of Potential Concern (COPCs) and Rationale for Proposed Remedial Action

Although screening assessment has not been completed at these PRSs, FU-3 expects that RDX, TNT, TNB, and barium will be found at V-Site and building 27 at levels above SALs and cleanup levels and hence will be COPCs. This conclusion is based on knowledge of process and FU-3 experience with the VCA at the 90s-Line (LANL 1996a) during fiscal year 1996. At V-Site, a survey of TA-16-515 for hazardous material in the drain line found no toxic substances (Kennedy

1970, 15-16-006) or radioactive contamination (Mitchell 1970, 15-16-007), but did find HE contamination (Courtright 1970, 15-16-004). Boracitol, along with other types of HE, is a COPC at V-Site. Boracitol contains TNT and boric acid. V-Site buildings associated with the use of boracitol will be analyzed for boron. Employees report that boracitol casting caused environmental stress such as dead trees in the outfall area of this drain system (Martin and Hickmott 1993, 15-16-497). A prevalent rumor indicates that a large pile of unusable barium nitrate was stored in the building.

Other operations in the V-Site area included x-ray radiography, electrochemistry, and HE product storage. These operations are likely to have produced smaller amounts of contamination of buildings and sumps than HE machining or casting because they only involved intact HE components. Buildings associated with V-Site operations were hosed down on a periodic basis, with wash water discharged to sumps and drainage systems. Therefore, this wash water may also have contained photographic chemicals including silver and chromium compounds. COPCs associated with the electroplating activities are metals, particularly chromium, and cyanide.

Casting operations were most likely to produce contamination at TA-16-27 and its sumps and drain lines. These operations consisted of melting powdered HE and pouring the melts into shaped molds. To control the cooling of the HE, casting buildings were generally equipped with piping arrays that provided water and steam to cooling jackets surrounding the molds. HE vapor, which is produced during melting of cast HE, tended to coat the interiors of casting buildings, particularly their ductwork. Following casting, the HE charges were moved to other buildings and machined to their final shape.

HE contamination was removed daily from facility equipment using mixtures of high pressure steam and hot water. The wash water drained through troughs in floors into sumps or leaked out through cracks in the building floors and walls, potentially contaminating both the sumps with their drainage systems and the ground around the casting buildings. Although the sump systems were designed to collect all of the waste HE, they functioned inefficiently. HE contamination frequently occurred adjacent to sumps due to spillage during sump cleaning, beneath the bottom of sumps due to leaks, at leaks or clogged points in the drain lines, or in the sump outfalls. During the cleanup of other area buildings during the 1960s, the highest levels of HE contamination in soils were invariably located within 20 ft of the sumps (Martin and Hickmott 1993, 15-16-497). During that cleanup operation, soils were cleaned to a residual level of 3% HE by weight, still a significant amount of HE contamination according to current standards.

Contaminants likely to be found at these PRSs include the high explosives RDX and TNT which are the components of the most widely used cast explosives. In similar HE-handling facilities at S-Site, previous D&D and VCA activities revealed that these two compounds were frequently found

at concentrations above cleanup levels. The presence of barium, found in the explosive baratol, is also anticipated.

Some of the PRSs in this plan are associated with cooling towers and storage areas. These areas might contain contamination from the chemicals used as algaecides in the cooling water system, the more toxic of which contained chromium. COPCs associated with drum storage are various types of HE, metals, SVOCs such as oils, and radionuclides.

The main drainage channel, if contaminated, could contain any or all COPCs discussed above for the PRSs in this plan. It may also contain COPCs from PRSs that have not yet been characterized but which contribute to the runoff in this channel.

COPCs for the PRSs included in this plan are shown in Table 1.1-1. The identification of COPCs was based on best professional judgment and the historical activities at each facility. Verification sampling suites were chosen conservatively and generally include full suite VOCs, SVOCs, metals, and HE. It is important to note that previous D&D and VCA activities at TA-16 (LANL 1996a) have demonstrated the effectiveness and accuracy of field screening methods such as the D-Tech immunoassay and Ensys colorimetric HE spot test kits. These methods detect many different types of HE and work effectively at a concentration range relevant to the field screening needs described in this plan.

2.0 SITE CHARACTERIZATION

RFI sampling under the ER Project has not been conducted at any of the PRSs discussed in this plan. As mentioned above, these PRSs are proposed for VCM because of their association and/or proximity with structures currently scheduled for D&D. In addition, historical anecdotal evidence indicates that these facilities may be contaminated; however, the nature and extent of contamination has not been determined. Previous sampling information, where available, is presented below.

2.1 RFI Information/Other Decision Data

No analytical information is available for the PRSs located at V-Site. A limited study of HE contamination associated with the TA-16-27 structure was conducted in 1945. Five sample locations underneath TA-16-27 were randomly selected. These five soil samples were subjected to the flame of a blowtorch to determine if the soils were explosive. The soil samples did not ignite,

TABLE 1.1-1

CONTAMINANTS OF POTENTIAL CONCERN

PRS	DESCRIPTION	HE	HE DEGRADA-TION PRODUCTS	HE BURN PRODUCTS	URANIUM	METALS	BORON	CYANIDE	VOCs[a]	SVOCs[b]
16-005(d)	Septic tank TA-16-177, served TA-16-27	X	X		X	X			X	X
16-006(g)	Septic tank TA-16-527, served TA-16-515	X	X		X	X	X	X	X	X
16-006(h)	Pump pit TA-16-526					X				X
16-013	V-Site courtyard storage area				X	X			X	X
16-017	Building foundations and structures	X	X		X	X	X	X	X	X
16-025(x)	Electroplating laboratory, TA-16-100	X	X	X		X		X	X	X
16-026(q)	TA-16-27 sumps and drainages	X	X		X	X			X	X
16-029(g2)	Pit TA-16-523	X				X[c]				X
16-029(h2)	Drain line for TA-16-95, -96, -97, -98	X	X			X				

TABLE 1.1-1 (continued)

PRS	DESCRIPTION	HE	HE DEGRADA-TION PRODUCTS	HE BURN PRODUCTS	URANIUM	METALS	BORON	CYANIDE	VOCs[a]	SVOCs[b]
16-029(w)	TA-16-100 sump	X	X			X		X	X	X
16-029(x)	TA-16-515 sump and drainline	X	X		X	X	X	X	X	X
16-031(c)	Cooling tower for TA-16-515	X	X	X		X				
16-031(d)	Cooling tower TA-16-28	X	X	X		X				
16-034(p)[c]	TA-16-41 foundation	X	X	X		X				X
C-16-065[d]	HE drum storage platform TA-16-185	X	X	X		X[e]				
C-16-068	Laboratory, TA-16-522	X	X		X	X			X	X
C-16-074	Drum storage area, TA-16-517	X	X		X	X			X	X
Main drainage	Main S-Site drainage channel	X	X	X	X	X		X	X	X

a. VOCs = volatile organic compounds for subsurface soil samples.

b. SVOCs = semivolatile organic compounds.

c. Samples will also be screened using BTEX immunoassay kits.

d. Samples will also be screened using PAH immunoassay kits.

e. COPCs include beryllium, a standard analyte in the metals analytical suite.

indicating that the level of HE in the samples was not a safety hazard (Huselton 1945, 15-16-152). An August 1995 VCA of the incinerator associated with TA-16-41 provided some data about the soil beneath the TA-16-41 basement foundation, PRS 16-034(p). Following completion of the VCA, a surface soil sample and a hand-augered soil sample were collected from a floor drain in the foundation. These soil samples represent PRS 16-034(p) contamination. The results indicated elevated levels of metals, particularly in the sample collected at depth. Copper was found at levels above upper tolerance limits (UTLs) in both samples. Metal concentrations above UTLs in the depth sample included copper at 448 ppm, lead at 130 ppm, antimony at 15.1 ppm, and zinc at 529 ppm. No metals were present at levels above SALs.

3.0 PROPOSED REMEDY

3.1 Description of the Proposed Remedial Action

Historical activities at these structures suggest that HE, metals, and other constituents may be present in the surface and subsurface soils at concentrations above background and/or cleanup levels. The proposed remedy is the removal of contaminated soil that would otherwise remain at the sites as a potential source of future contamination. This will be accomplished following the removal of structures by the D&D contractor.

The remediation of the sites is broken down into two stages in order to allow coordination with D&D. The two stages are described as follows:

- Stage I: D&D of underground and aboveground structures by the D&D contractor will be conducted during this stage. Field screening will be conducted by FU-3 field personnel immediately following D&D of the structures. The number of screening samples described in this plan are minimal numbers. Additional screening locations and samples will be taken based on field observations and earlier results. Field screening methods that quantitatively detect contaminants at the proposed cleanup levels are available for the most likely COPCs at these PRSs. Field screening, guided by a screening level of 50% of the cleanup level, will be used to determine the amount of contaminated soil to be removed, if any, by FU-3 field personnel. This will conservatively ensure that all contaminated soil above the cleanup levels is removed during this stage of the cleanup. The screening level of 50% of the cleanup level was chosen to compensate for the potential uncertainty associated with some of the field analytical methods and to ensure that cleanup levels would be achieved. This measurement error is larger than that associated with laboratory analytical methods on which final cleanup (i.e., verification)

decisions will be based. Contaminated soil will be segregated by waste types. Waste management samples will be collected from the segregated wastes.

- Stage II: Verification sampling will be conducted in the soil remaining at the PRS to confirm that cleanup levels were achieved. This sampling will include all of the laboratory samples described in the approved work plan as well as additional verification samples described in this plan. It is important to note that all final cleanup decisions will be based on laboratory samples.

Certain PRSs may be sampled and characterized prior to Stage I and D&D, including sites where a structure has already been removed, or sites that could be destroyed during D&D due to their location near a structure scheduled for D&D. These PRSs include 16-031(d), 16-013, 16-026(q), C-16-065, C-16-068, C-16-074, and possibly others to be identified later.

3.1.1 General Cleanup Strategy

The accepted sampling strategy proposed and approved in the RFI Work Plan for OU 1082 (LANL 1994, 1160) will be used during sampling of these PRSs as part of this VCM. However, it is important to note that additional sampling and VCM activity will augment and expand the accepted work plan, including the changes listed below:

1) In all cases, D-Tech HE field screening kits will be used in addition to the HE spot test kits called for in the accepted RFI Work Plan. These relatively new field screening kits are more appropriate because their level of detection is low enough to capture the screening action levels (SALs) and cleanup levels proposed for HE. Approximately one-half of the spot test screened samples will be additionally screened using D-Tech. In areas where TNT is detected during field screening, Ensys HE field screening kits will also be used. These immunoassay kits detect concentrations of TNB, an impurity and breakdown product of TNT. Note that these quantitative field screening methods have been approved for inclusion in EPA's SW-846 Methods.

2) In most cases, elevated field screening results will be used to bias the location of laboratory samples. However, if the results of field screening indicate that contaminants in the soil are present above 50% of the cleanup level, that soil will be excavated until field screening results obtained at least 2 ft vertically and 2 ft horizontally from the excavation are no longer above 50% of the cleanup level. Verification samples will be collected in the bottom of the excavation and sent for laboratory analysis to confirm that excavation has removed contaminated soil above cleanup levels.

3) The following rules will be used to select locations for laboratory samples:

   - For HE field screening, samples with RDX values greater than detection limits on the D-Tech field kit but less than 50% of the cleanup level will be selected for laboratory analysis. If RDX is not present, samples with TNT values greater than detection limits on the D-Tech or Ensys field kit but less than 50% of the TNB cleanup level will be selected for laboratory analysis. The selection of TNT screening samples will ensure that trinitrobenzene (TNB), a TNT-related compound with a low SAL and cleanup level, will be appropriately detected.

   - For metals screening, samples will be selected based on the ratio of x-ray fluorescence spectroscopy (XRF) measurements to SALs for the metals most likely to be found at these PRSs: barium, lead, chromium, copper, silver, and nickel. This subset of metals will be used for selecting laboratory samples.

   - In the absence of other positive field screening values, photoionization detector (PID) results and beta-gamma field screening will be used to bias laboratory sample location.

4) All samples will be screened for radioactivity and HE in order to permit safe handling and transportation. Samples may also be field screened for COPCs other than HE. These COPCs may include VOCs; polyaromatic hydrocarbons (PAHs); benzene, toluene, ethylbenzene, and xylene (BTEX); and metals. VOCs are screened with a PID. PAHs and BTEX can be field screened with immunoassay test kits. Metals are screened by XRF.

5) All samples that field-test positive for HE will first be analyzed by an on-site laboratory to determine if total HE content in the sample exceeds 5%. No further analyses will be performed on such samples. Per the logic previously stated, these soil locations will be removed as contaminated soil. Remaining laboratory samples will be shipped to off-site laboratories to be analyzed for the relevant COPCs.

6) All bounding samples collected at depth will be obtained within an interval located 2 ft below the excavation, based on field screening results. The clean interval is defined as field screening concentrations of less than 50% of the cleanup level. This will ensure that vertical extent has been determined below 2 ft of an excavated area.

7) Wherever appropriate and possible, bounding and confirmatory samples will be collected at the soil-tuff interface to detect conditions of potential interflow and increased contaminant mobility. Samples collected at the soil-tuff interface will contain soil from above the interface boundary as well as tuff from below the interface boundary. The field team will attempt to

obtain equal quantities of soil and tuff, with the success of this approach dependent upon physical restrictions and the recovery of individual samples.

8) All laboratory samples analyzed for SVOCs will be analyzed for tentatively identified compounds (TICs). All HE samples will be analyzed for an expanded suite of HE in order to determine if non-standard HE are present at the site. This approach will detect previously unknown COPCs at these PRSs, if present.

9) Best management practices, such as placing straw bales in drainages and plastic coverings over excavations, will be implemented throughout the VCM in order to minimize any migration of contamination off-site. The approach to these protective measures is described in the Surface Water Pollution Prevention Plan prepared for this VCM.

All ER activities will be conducted using the appropriate LANL-ER-SOPs (standard operating procedures). Surface samples will be collected according to LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples. Subsurface samples will be collected according to LANL-ER-SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. If sludge samples are collected from septic tanks, they will be collected according to LANL-ER-SOP-06.15, Coliwasa Sampler for Liquids and Slurries.

Drilling will be conducted according to LANL-ER-SOP-04.01, Drilling Methods and Drill Site Management. Samples will be collected from the borehole using a stainless steel split-spoon sampler according to LANL-ER-SOP-06.24, Sample Collection from Split Spoon and Shelby Tube Samplers.

Excavation and trenching activities will conform to LANL-ER-SOP-03.10, Trenching and Logging. Samples will be collected from within the trench (if the trench does not meet the definition of a confined space) or from the bucket of a backhoe or other excavation device. Collection of the soil will conform to LANL-ER-SOP-06.09, Spade and Scoop Method for Collection of Soil Samples.

Sample-handling procedures will conform to LANL-ER-SOP-1.01, General Instructions for Field Investigations; LANL-ER-SOP-1.02, Sample Containers and Preservation; and LANL-ER-SOP 1.03, Handling, Packaging, and Shipping Samples.

Field screening will be carried out either *in situ* or in a field trailer located across from building TA-16-27. HE spot testing, radiological screening, volatile organic screening, and possibly XRF screening will be conducted *in situ*. Otherwise, soil samples will be brought back to the field trailer for XRF screening of metals, and for D-Tech and Ensys screening of RDX, TNT, BTEX, and PAHs.

3.1.2 Detailed Sampling and Cleanup Activities

During Stage I activities, D&D personnel will remove structures associated with the PRSs. Stage I cleanup activities will also include soil removal by ER contract personnel following D&D of the structures.

Once D&D personnel have removed the structures, potentially contaminated soil will be exposed for easier observation and sampling. Field screening and laboratory samples will be collected during Stage I to determine which COPCs are present and the extent of the contamination. Soil will be removed based on field screening results from HE test kits and XRF. A threshold of 50% of the cleanup level will be used to determine if soil needs to be excavated and removed. Cleanup levels are discussed in Subsection 3.2 of this document. D&D personnel will remove only structures, foundations, and incidental soil. Contaminated soil excavation, waste segregation, and waste removal will be conducted by FU-3 field personnel per this plan.

As mentioned in subsection 3.1, certain PRSs will be sampled and characterized prior to D&D: 16-031(d), 16-013, 16-026(q), C-16-065, C-16-068, and C-16-074. All of these PRSs will be sampled in accordance with the approved RFI Work Plan, although PRS 16-026(q) will require additional sampling as well. Of the PRSs in the area near TA-16-27, PRSs 16-031(d) and C-16-065 will be sampled and characterized first. This will allow heavy equipment to move in closer to TA-16-27 without destroying these PRSs. Following characterization of these two PRSs, the TA-16-27 sumps associated with PRS 16-026(q) will be sampled and characterized. These sumps are located very near the foundation of TA-16-27 and would be destroyed during D&D of the structure. Finally, the rest of PRS 16-026(q) will be sampled and characterized before the exterior D&D of TA-16-27 begins. D&D activities taking place inside the TA-16-27 structure will not interfere with the proposed sampling and characterization of the PRSs.

The D&D contractor will remove all aboveground and underground structures associated with the PRSs in this plan, with the exception of 16-034(p). In addition, no D&D activities will take place in the area associated with PRSs 16-025(x), 16-029(w), and the main drainage, because nothing remains or exists at these sites that require D&D. All remediation activities associated with these four PRSs will be the responsibility of FU-3 and its designated contractors. The four PRSs will be sampled in accordance with the approved RFI Work Plan. However, a backhoe, trackhoe, or other equivalent earth-moving device may be used in addition to, or in lieu of, auger drilling and split-spoon sampling.

3.1.2.1 Approved Work Plan Sampling

Stage I and Stage II sampling activities will be at least as extensive as those described in the approved RFI Work Plan for all PRSs addressed during this VCM (LANL 1993, 1094). Additional samples will be collected at many of the PRSs in this plan; however, the following PRSs will not require additional samples and will be sampled in accordance with the approved RFI Work Plan: 16-013, 16-025(x), 16-029(w), 16-031(d), 16-034(p), C-16-065, C-16-068, C-16-074, and the main drainage.

The following descriptions restate the approved RFI Work Plan sampling for these PRSs located at V-Site. Laboratory sampling locations for the V-Site PRSs are shown schematically in Figure 3.1.2.-1.

PRS 16-013 is the courtyard storage area located at V-Site (Figure 3.1.2-1). Five surface soil samples (at 0- to 6-in. depth) will be collected as screening samples. These samples will be collected just to the north of the paved courtyard area, where runoff from the paved courtyard is carried and will be screened for HE by spot test, VOCs, metals by XRF, metals by XRF, and radioactivity. Three of these samples will be additionally screened by D-Tech. Using these field screening results to bias the locations, two laboratory samples will be collected at PRS 16-013. In the absence of positive field screening, laboratory samples will be selected from the two easternmost screening locations (LANL 1993, 1094). Laboratory samples will be analyzed for the COPCs previously presented in Table 1.1-1.

PRS 16-025(x) is the site of a former electroplating facility, TA-16-100 (Figure 3.1.2-1). The three laboratory samples originally proposed for this site in the approved Work Plan will be collected during the VCM. Although TA-16-100 no longer remains at this site, aerial photographs will be used to determine the former location of this structure. Eight screening samples will be randomly selected from within the building's footprint. These samples will be screening for HE by spot test, VOCs, metals by XRF, and radioactivity. Four of these samples will be additionally screening using D-Tech. Samples will be collected to a depth of 24 in. because the site was previously disturbed. Metals are the most likely type of contamination. XRF field screening results for chromium, lead, nickel, and copper will be used to bias the location of laboratory samples. HE field screening results may also be used to bias analytical sample location. Laboratory samples will be analyzed for the COPCs previously presented in Table 1.1-1.

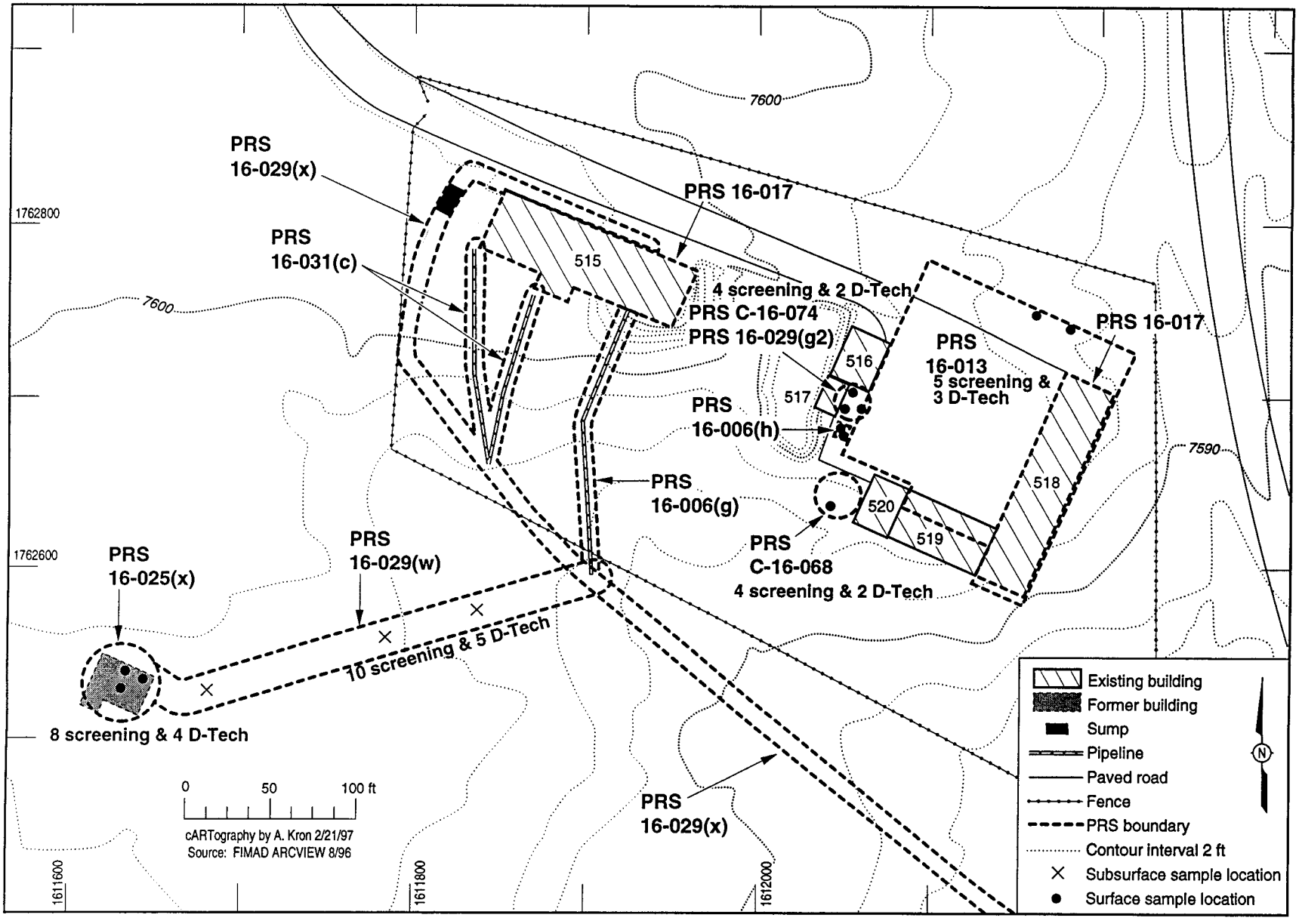


Figure 3.1.2-1. Schematic laboratory sampling locations for PRSs 16-006(h), 16-013, 16-025(x), 16-029(g2), 16-029(w), C-16-068 , and C-16-074 at V-Site.

PRS 16-029(w) is the drainage from the sump associated with TA-16-100. The original Work Plan proposed a sampling plan similar to that for PRS 16-025(x) (LANL 1994, 1160). Three laboratory samples will be selected from 10 screening sample locations that have been randomly selected along the drainage (Figure 3.1.2-1). These 10 samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Five of these samples will be additionally screened by D-Tech. These surface samples will be collected at a depth of 12 in. Elevated field screening values for the metals listed above, as well as HE field screening results, will be used to bias the location of laboratory samples. One of the laboratory samples will be collected in the area of the original sump. Samples will be analyzed for the COPCs previously presented in Table 1.1-1.

PRS C-16-068 is the site of former laboratory building TA-16-522. Four surface soil samples (at 0- to 6-in. depth) are proposed for field screening at this PRS (Figure 3.1.2-1). One sample will be located in each quadrant of the PRS. These four samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Two of these samples will be additionally screened by D-Tech. One laboratory sample will be selected randomly, unless field screening results for HE can be used to bias the location of one laboratory sample. In the absence of positive HE field screening results, XRF field screening results will be used to select the location of the laboratory sample. The sample will be analyzed for the COPCs previously presented in Table 1.1-1.

PRS C-16-074 is the site of a former drum storage area located east of TA-16-517. The approved RFI Work Plan sampling at this site specified four 6-in. cement cores to be collected and field screened. However, because D&D is scheduled to remove this concrete, adjustments to the approved RFI Work Plan sampling are required. Following removal of the concrete by D&D, soil samples will be collected at the same locations specified for the concrete cores (Figure 3.1.2-1). One sample will be located in each quadrant of the PRS. These four samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Two of these samples will be additionally screened by D-Tech. One laboratory sample will be selected randomly, unless field screening results can be used to bias the location of one laboratory sample. The sample will be analyzed for the COPCs previously presented in Table 1.1-1.

The following descriptions restate the approved RFI Work Plan sampling for PRSs located near TA-16-27, PRS 16-034(p), and the main drainage. Laboratory sampling locations for these PRSs are shown in Figures 3.1.2-2 through 3.1.2-4.

PRS 16-031(d) is the site of a former cooling tower, TA-16-28. The approved sampling plan for this site proposed that five surface samples be collected and screened for metals contamination, particularly chromium. Screening samples will be collected in the center of the former cooling tower, and from each quadrant of the footprint. These five samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Two of these samples will be additionally screened by D-Tech. These samples will be collected to a depth of 12 in. Although the structure is no longer present, its footprint has been located. One laboratory sample will be selected from the screening samples, based on the highest chromium screening value detected (Figure 3.1.2-2). The sample will be analyzed for the COPCs previously presented in Table 1.1-1.

PRS C-16-065 is a former drum storage area, TA-16-185. Five subsurface soil samples (at a depth of 12 to 24 in.) were originally proposed for BTEX field screening. Additional field screening for volatiles, radioactivity, HE, and metals will also be conducted. The samples will be collected using a hand auger, a backhoe, or equivalent earth-moving device, with samples collected from the backhoe bucket. These samples will be taken from the center and from each quadrant of the PRS. These five samples will be screened for HE by spot test, VOCs, metals by XRF, radioactivity, and BTEX. Two of these samples will be additionally screened by D-Tech. One laboratory sample will be selected randomly, unless field screening results can be used to bias the location of the laboratory sample (Figure 3.1.2-2). The sample will be analyzed for the COPCs previously presented in Table 1.1-1.

PRS 16-034(p) is the foundation of a former laboratory building and the former site of an incinerator. At PRS 16-034(p), the basement foundation will be removed prior to sampling. Once the concrete basement foundation has been removed, nine soil screening samples will be collected in a 3 x 3 grid pattern. These nine samples will be screened for HE by spot test, VOCs, metals by XRF, radioactivity, and PAHs using immunoassay kits. Six of these samples will be additionally screened by D-Tech. Soil samples will be collected to a depth of 0 to 6 in. Four laboratory samples will be selected from the screening samples, using field screening results to bias the location. Two samples will be selected based on HE field screening results and two samples will be selected based on metals field screening results in order to ensure that the broadest range of contaminants has been studied (Figure 3.1.2-3). Samples will be analyzed for the COPCs previously presented in Table 1.1-1.

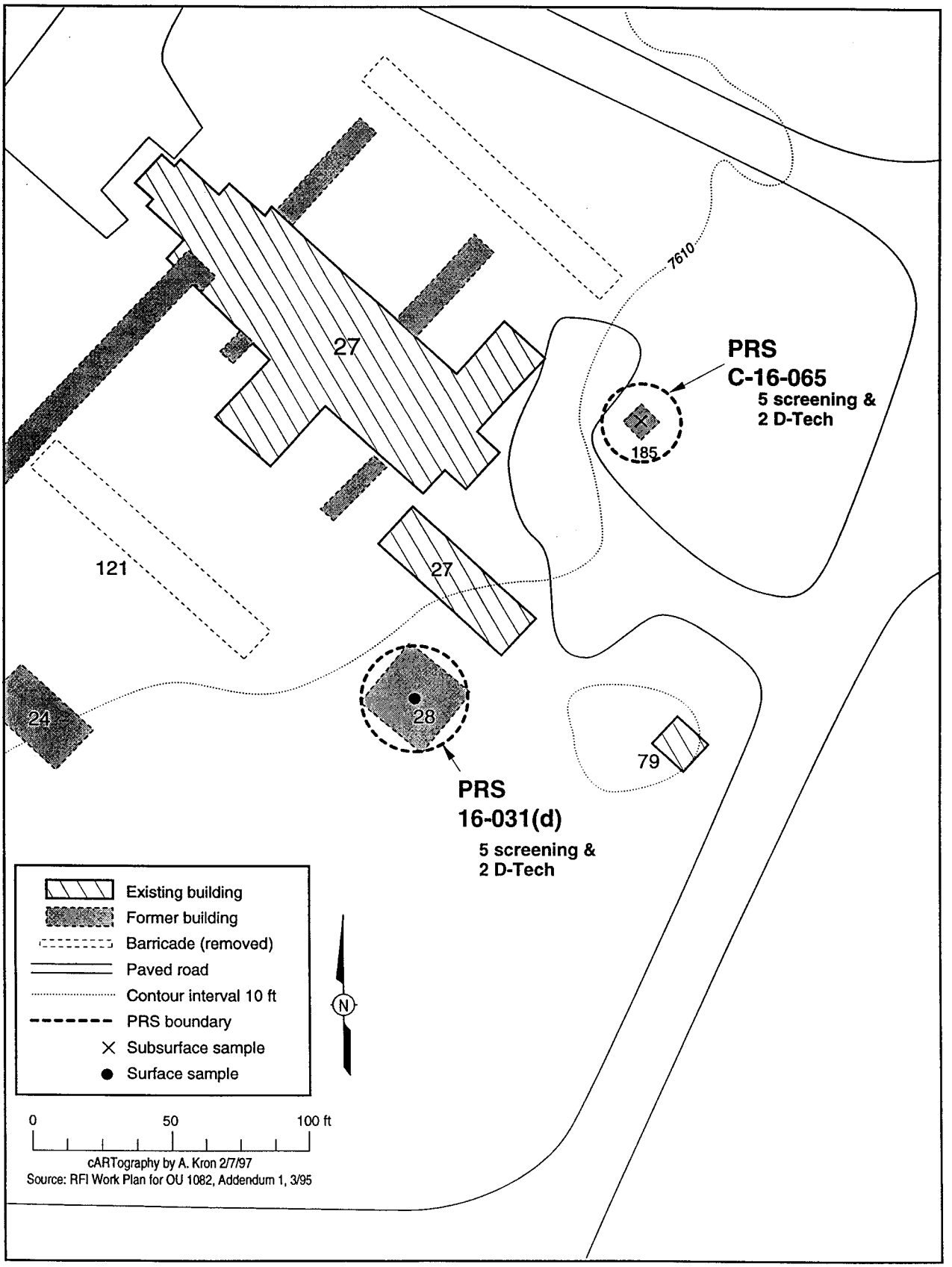


Figure 3.1.2-2. Schematic laboratory sampling locations for PRSs 16-031(d) and C-16-065 near TA-16-27.

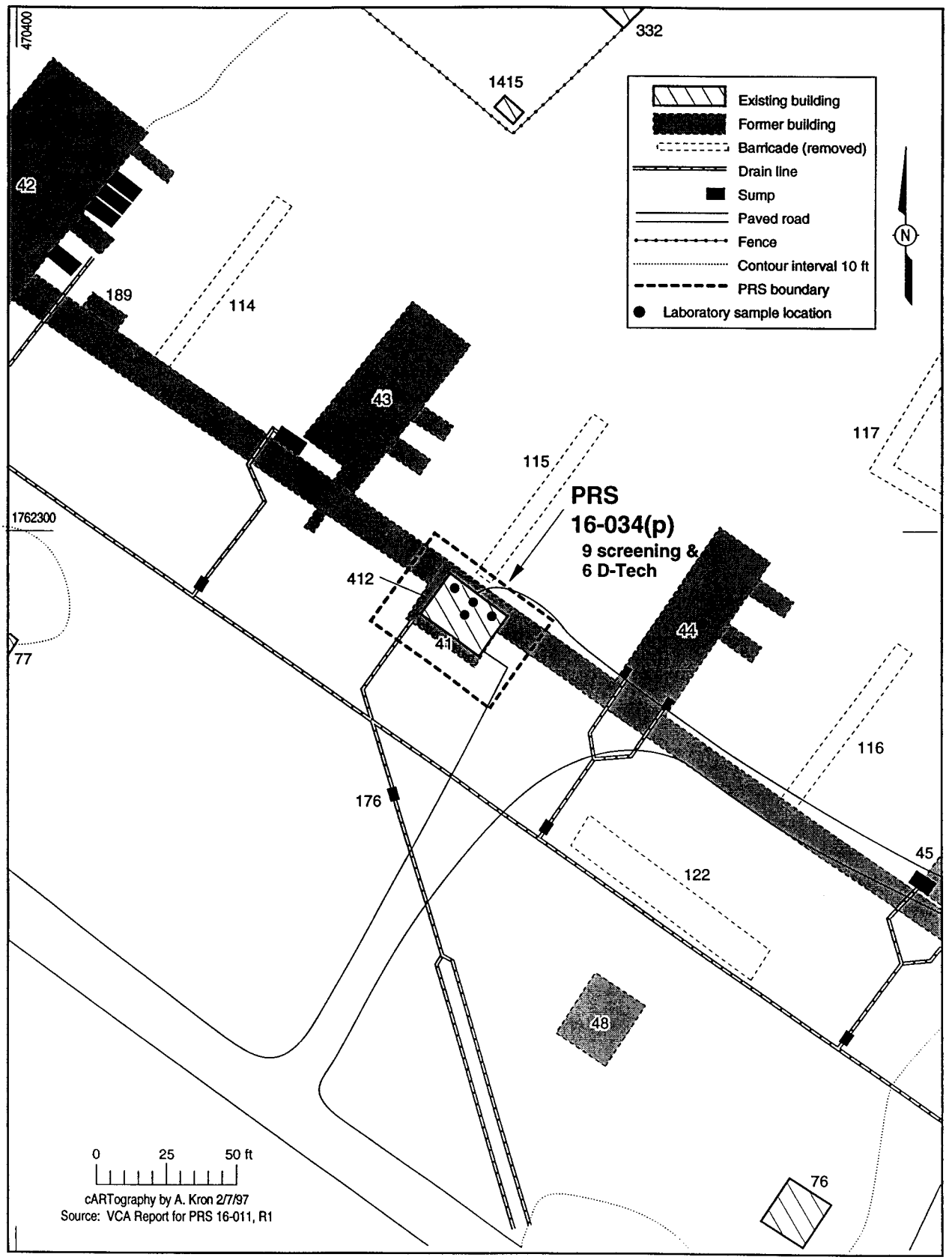


Figure 3.1.2-3. Schematic laboratory sample locations at PRS 16-034(p).

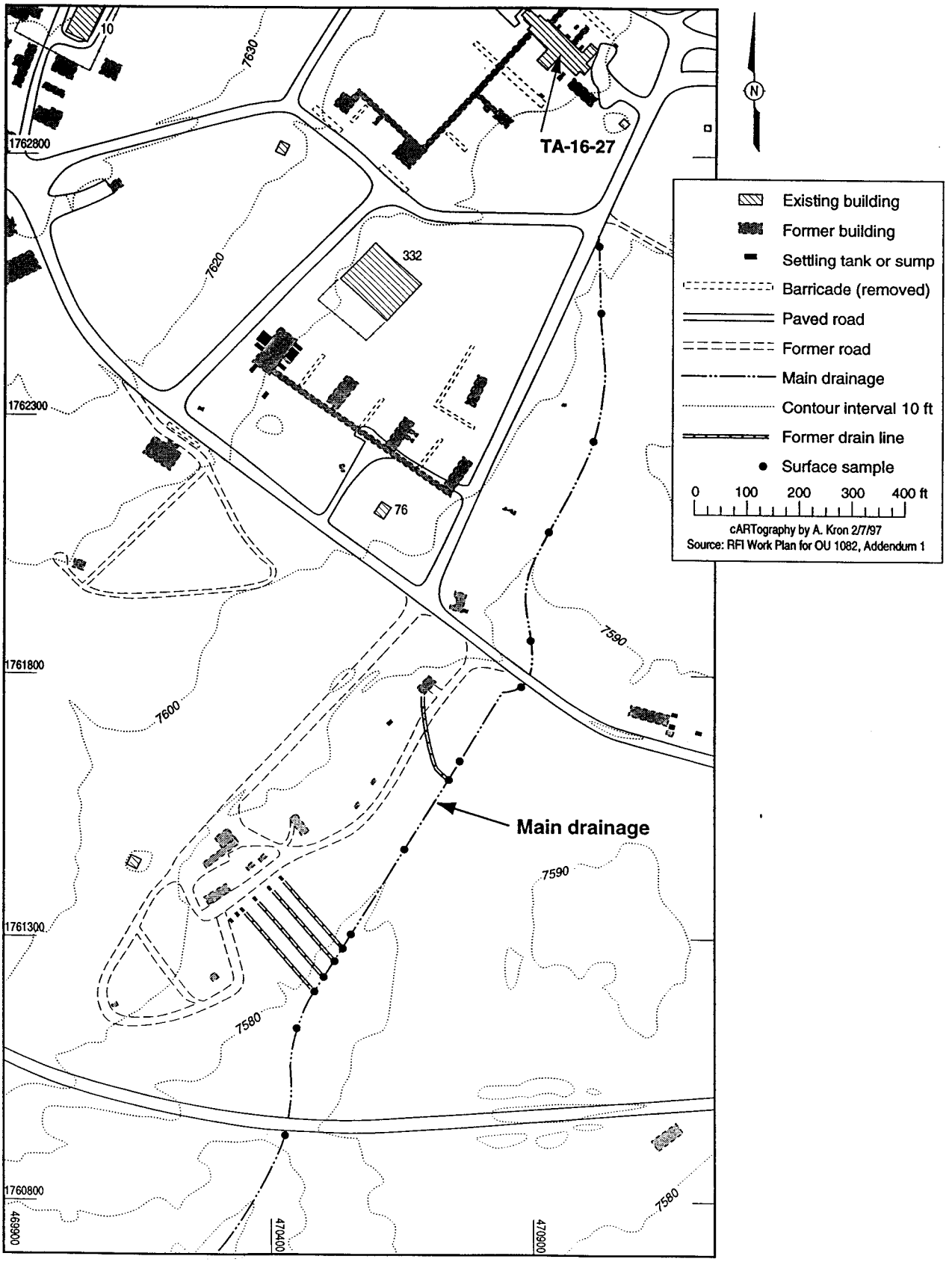


Figure 3.1.2-4. Schematic sampling locations for the main drainage.

The main drainage will contain 11 surface samples collected to a 6-in. depth as shown in Figure 3.1.2-4. Samples will be distributed at roughly 200-ft intervals along the length of the drainage channel, beginning across the road from the terminus of PRS 16-026(q). Sample collection will be biased to clay-rich sediment traps using the screening logic previously presented. Five additional laboratory samples from the 12-in. to 18-in. interval will be collected in the southern portion of the drainage, near the intersections of PRSs 16-029(b2, d2, e2, and v) drainlines (not discussed in this plan). Samples will be analyzed for the COPCs previously presented in Table 1.1-1.

3.1.2.2 Augmented Work Plan Sampling

The remaining PRSs require additional sampling during VCM activity and therefore go beyond and augment the sampling presented in the approved RFI Work Plan. Grouped by site, the plan to sample these PRSs is described in more detail below.

PRSs that require additional sampling at V-Site include PRSs 16-029(x), 16-031(c), and 16-006(g). Laboratory sampling locations for these PRSs are shown schematically in Figure 3.1.2-5.

PRSs 16-029(x) and 16-031(c) will require sampling in addition to that described in the accepted work plan. The approved RFI Work Plan called for at least seven laboratory samples from PRSs 16-029(x) and 16-031(c). The seven samples consisted of five samples from the swale area and two samples from the sump. In contrast, a total of 13 to 15 subsurface laboratory samples will be collected from within PRS 16-029(x), excluding the swale area, and PRS 16-031(c) boundaries under the augmented sampling plan, as shown in Figure 3.1.2-5.

Of the 13 minimum laboratory samples mentioned above [swale area PRS 16-029(x) excluded], two of the laboratory samples will be collected from the sump associated with TA-16-515, located in the northern portion of PRS 16-029(x). In accordance with the original sampling plan, four field screening samples will be collected along each side of the sump, with an additional field screening sample collected from underneath the sump. Three laboratory soil samples will be collected within the boundary of PRS 16-031(c). The remaining eight to ten laboratory samples will be collected in the drainage itself. These include one soil sample at each of the manholes TA-16-793 through TA-16-797, as well as a minimum of three and a maximum of five soil samples collected beyond manhole TA-16-797 to the outfall into the

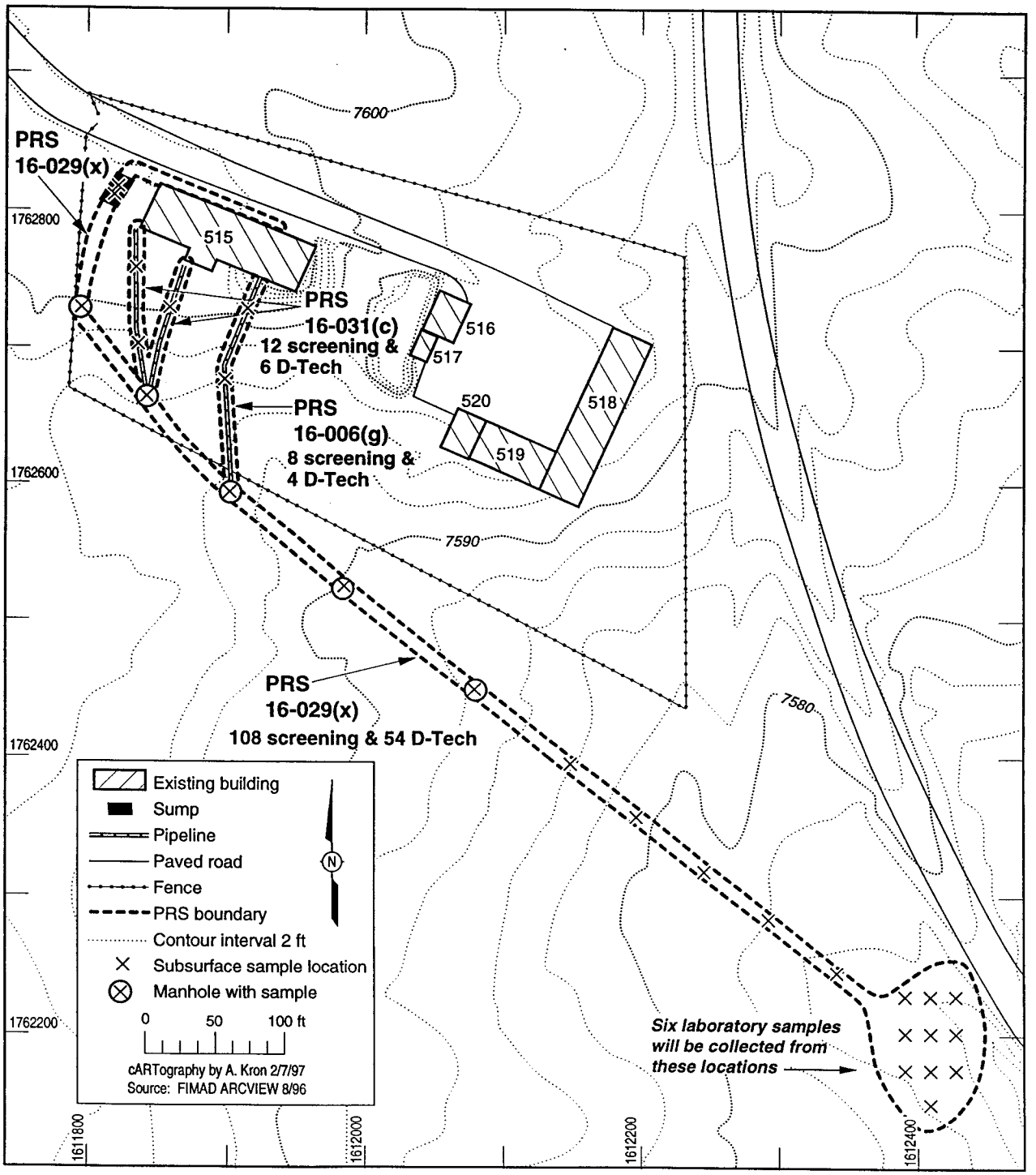


Figure 3.1.2-5. Schematic laboratory sampling locations for PRSs 16-029(x), 16-031(c), and 16-006(g) at V-site.

swale at the end of PRS 16-029(x). Location of additional samples will be based on the results of field screening for HE. More than twice as many field screening samples will be used to select the laboratory samples. These soil samples will be collected by either excavating trenches using a backhoe (or equivalent type of earth-moving equipment) or hand augering to anticipated depths of up to 24 in.

The swale located at the end of PRS 16-029(x) is expected to be contaminated because contaminated waste waters collected there historically. The proposed sampling of the swale augments the original work plan (LANL 1994, 1160). A minimum of 10 sample points will be selected in a stratified random pattern within the swale circumference. These samples will be collected with a hand auger to a depth of 18 in. and will be screened by the HE spot test, D-Tech test kits, and XRF. If 10 samples fail to bound the lateral extent of contamination in the swale, more surface samples will be collected until the lateral extent has been defined. These samples will be used to bias the location of two boreholes in the swale, prior to any excavation. The selection of borehole locations will be based primarily on HE field screening results, followed by field screening for metals, particularly barium. If the screening results cannot be used for biasing, the default borehole locations will be at the outfall into the swale and at the lowest point within the swale. Boreholes will be drilled until 10 continuous feet of uncontaminated material has been excavated, not to exceed a total depth of 15 ft. Continued contamination at a depth of 3 ft into tuff is a condition for stopping work and reevaluating the cleanup strategy for this PRS. The presence of water in these boreholes is also a condition for stopping work and reevaluating the cleanup strategy for this PRS. Based on the highest concentration of HE contamination, or barium contamination if there is no HE contamination or contamination with other metals, two laboratory samples will be selected from the grid samples. Two laboratory samples will be selected from the interface and the bottom of each borehole drilled in the swale. A total of six laboratory samples will be collected from the swale region to determine if the swale is contaminated.

Based on the results from the six grid and borehole samples, and from samples collected upgradient from the swale, waste type will be determined and an estimate can be made of the waste volume to clean up the swale. This estimate will be used to determine if disposal options are available for the waste if it is generated during the VCM of PRS 16-029(x). If the actual waste volume generated during the course of the VCM exceeds the originally estimated volume by a factor of two or more, or if mixed wastes are encountered, the cleanup strategy for this PRS will be reassessed before proceeding with the VCM as proposed. Contaminated soil in the swale will be excavated based on screening results collected during excavation. Soil that is contaminated above 50% of the cleanup level will be removed.

Following excavation, 8 to 10 verification samples will be collected in and around the excavation. At least two samples will be collected at depth below the excavation as bounding samples. The remaining verification samples will be collected from the surface within the excavation. All sample locations are shown in Figure 3.1.2-5 below.

PRS 16-006(g) is the septic tank located at V-Site. It is expected to have little or no detectable contamination. Approximately eight screening locations will be sampled at this PRS following the removal of the tank by D&D. These eight samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Four of these samples will be additionally screened by D-Tech. Two laboratory samples will be collected within the boundary of this PRS, one in the excavation of the former tank area and one in the drainline.

PRSs that require additional sampling near Building TA-16-27 include PRSs 16-026(q) and 16-005(d). Representative sample locations are shown in Figure 3.1.2-6, including all sample locations specified in the original work plan (LANL 1994, 1160), along with additional schematic sample locations.

PRS 16-026(q) is the drainage associated with TA-16-27. The original work plan proposed reconnaissance sampling appropriate for RFI Phase I at PRS 16-026(q) (LANL 1994, 1160). This PRS will require sampling in addition to that described in the accepted work plan because the drainage may be contaminated and the nature and extent of contamination needs to be determined. In addition, the building sumps have been removed and may be difficult to locate for sampling.

More than 80 HE field screening tests will be conducted within the PRS boundary. If field screening results indicate that excavation is required, a limited number of elevated screening samples will be sent for rapid turnaround laboratory analysis for uranium. This will determine if the excavation of soil at PRS 16-026(q) could generate mixed waste and significantly increase costs for waste disposal. Potential generation of mixed waste will require reassessment of the VCM strategy at this PRS.

At each sump, eight screening samples will be collected and screened for HE by spot test, VOCs, metals by XRF, and radioactivity. Four of these samples will be additionally screened by D-Tech. These HE screening samples will be used to bias the location of laboratory samples. Samples will be collected to a depth of at least 3 ft into tuff and will be screened on 1- to 2-ft intervals with the HE spot test as well as the PID and XRF. A backhoe (or equivalent type of

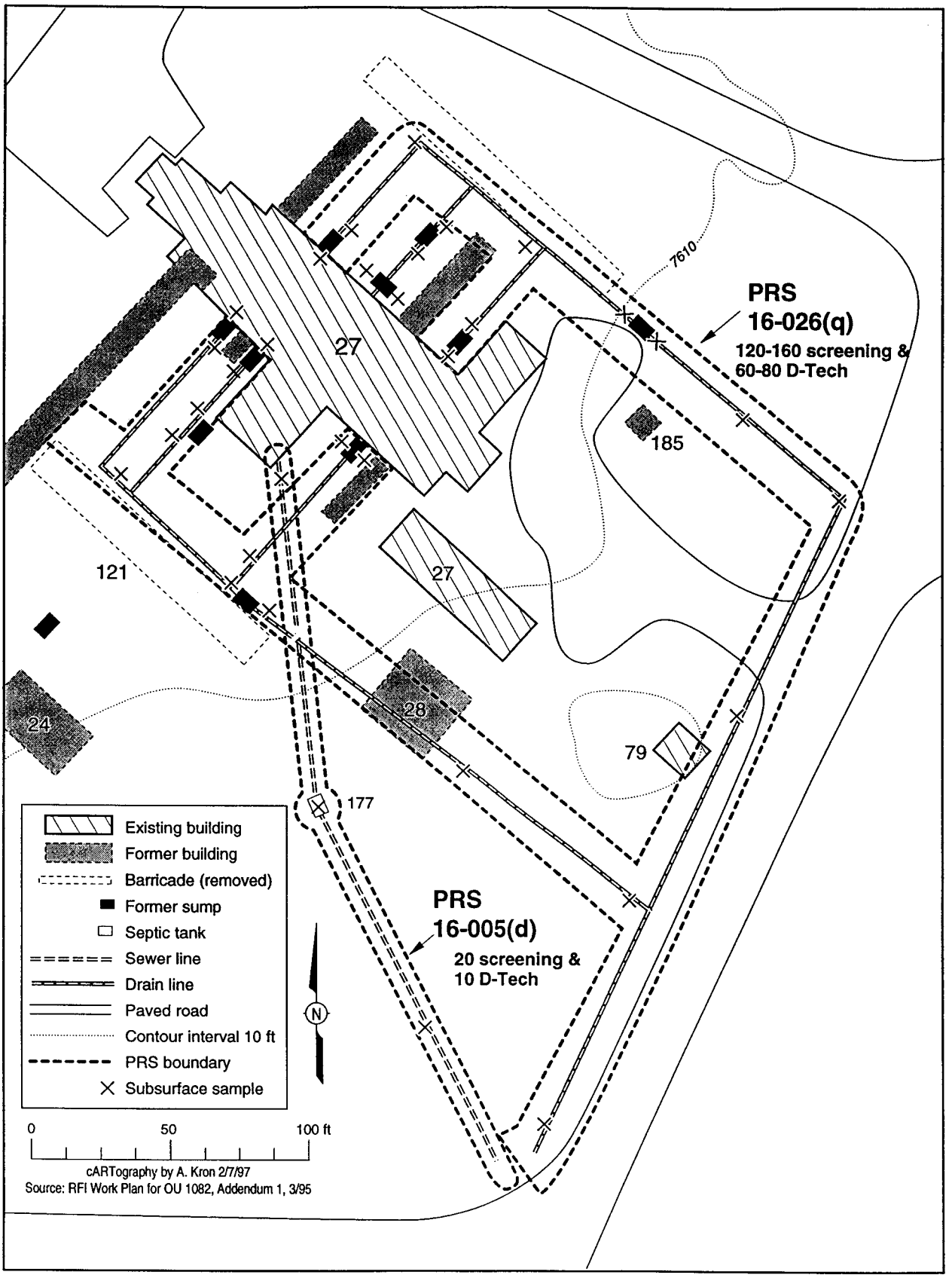


Figure 3.1.2-6. Schematic laboratory sampling locations for PRSs 16-026(q) and 16-005(d).

earth-moving equipment) may be used to excavate trenches at each sump location to depths just below tuff. The original work plan required at least 1 laboratory sample from each sump (LANL 1994, 1160); however, 2 laboratory samples will be collected at each of the 10 sumps associated with PRS 16-026(q), for a total of 20 laboratory sump samples.

Screening results will be used to bias the location of the two laboratory samples per sump, unless the screening results are high enough to warrant excavation in that area. If screening results indicate the presence of contaminants above 50% of the cleanup level, excavation will be conducted using field screening results to guide soil removal. If excavation is conducted, verification samples will be collected in the excavation and sent for laboratory analysis. Verification samples will consist of 0- to 6-in. depth soil samples collected from the bottom of the excavation, near the area of greatest contamination. Verification samples will replace any laboratory samples that might have been removed by excavation. If excavation around the sumps is not necessary, field screening results will be used to bias laboratory sample location. One of the laboratory samples will be collected from an 18-in. interval below the estimated location of the bottom of the sump. The other sample will be collected from an interval located at least 3 ft into the tuff, to bound the vertical extent of contamination. If the tuff interface is located at a depth of 10 ft or greater, the sample collection strategy at this site may be reassessed and altered. It is likely that the sumps nearer TA-16-27 will be more easily and accurately located and will be shallower than the sumps located farther away from the building.

In addition to collecting sump samples, drainage samples will also be collected and sent for laboratory analysis. The original Work Plan (LANL 1994, 1160) stated that four specific areas were to be sampled and sent for laboratory analysis: pipe joints in the drainage north of TA-16-27 (two locations), pipe joints in the drainage south of TA-16-27 (two locations), the pipe joint at the intersection of the north and south drainage, and the pipe joint at the terminus of PRS 16-026(q). The sample locations are included in Figure 3.1.2-6.

Additional screening samples will be collected at 75-ft intervals along the length of the drainage. Samples will be collected with a hand auger, backhoe, or equivalent earth-moving device. Samples will be screened at 1- to 2-ft intervals, and the excavation of cores will not extend into the tuff. Sampling will not extend further than 5 ft in depth. A total of at least 10 laboratory samples will be collected in the drainage to determine COPCs and contaminant extent. These samples will be biased to HE field screening results or, as a default, will be collected at the soil-tuff interface, or at the bottom of the drainage ditch, if it can be detected. If the drainage ditch is found to contain contaminants at levels above 50% of the cleanup level, soil will be excavated from the contaminated area. Any of the characterization sample locations

that are removed by the excavation will be replaced with laboratory samples collected from a 0- to 6-in. interval at the bottom of the excavation. At least 10 verification samples (which may include unexcavated characterization samples) will be required at the drainage portion of PRS 16-026(q).

In total, between 30 and 40 laboratory samples will be collected within the PRS 16-026(q) boundary. The original work plan called for only 14 laboratory samples selected from 27 screening samples (LANL 1994, 1160).

Waste characterization samples will also be collected from any contaminated soil. Approximately five toxicity characteristic leaching procedure (TCLP) samples are expected to be required. Soil will be stockpiled for short periods of time and/or stored in waste drums. Small rolloffs may be used to segregate waste in order to minimize the amounts of the different waste streams expected. The waste samples will be analyzed for SVOCs, VOCs, TCLP metals, and HE.

PRS 16-005(d) will require sampling in addition to that described in the work plan. The location of this PRS is not well known. Geophysical surveys have not determined an exact location for the septic system associated with PRS 16-005(d). The site where this septic system connected to TA-16-27 is evident and can be used as a starting point to determine the path of the septic line. Trenches may be required along the expected path of the septic system in order to find evidence of the drainage trench.

Once the drainage trench has been located, up to 20 screening samples will be collected in 5 different locations along the trench. These soil samples will be screened along 1- to 2-ft intervals down to a maximum depth of 5 ft below the bottom of the drainage trench. All samples will be screened for HE by spot test, VOCs, metals by XRF, and radioactivity. At least one half of the samples will be screened with a D-Tech kit. Three laboratory samples, biased to positive HE field screening results, or barium screening values if HE is not detected, will be selected from the group of screening samples (Figure 3.1.2-6). If more than three samples yield positive field screening results, the samples closest to the septic tank will be selected for laboratory analysis. This ensures that all COPCs are detected and analyzed.

A similar strategy requiring three laboratory samples selected from five locations was proposed in the original work plan; however, the number of field screening samples has been augmented. Screening and laboratory samples will not be collected from the material overlying the drainage trench. It is presumed that this fill material has not been contaminated by the leachate from the septic system.

The following descriptions present the sampling proposed for PRS 16-017 (building footprints) and PRS 16-029(h2).

PRS 16-017 consists of the footprints for the following structures in this plan: TA-16-10, TA-16-27, and TA-16-515, -516, -517, -518, -519, and -520. Laboratory sampling locations are shown schematically in Figure 3.1.2-7.

No formal sampling plan was proposed in the original RFI Work Plan (LANL 1994, 1160) for PRS 16-017. The generic logic provided in the RFI Work Plan required extensive field screening, particularly at leak points, as well as locating laboratory samples at a depth of 3 ft into tuff. This was in addition to surface soil samples. These sampling guidelines have been expanded into the sampling plan described below. Building footprints have been grouped, where appropriate, to maximize the effectiveness of sample results (LANL 1994, 1160). Samples will be analyzed for the COPCs previously presented in Table 1.1-1.

- Sixteen samples will be collected and screened for HE by spot test, VOCs, metals by XRF, and radioactivity from the footprint of TA-16-10, which was an HE mold cleaning and storage building. Eight of these samples will be additionally screened by D-Tech. Field screening results will bias the locations of four laboratory samples. Surface (0- to 6-in. depth) sample locations will be selected by stratified random sampling unless there is visual evidence of cracks in the floors or positive HE field screening results. Barium values above background may also bias sample collection.

- Twenty samples will be collected and screened for HE by spot test, VOCs, metals by XRF, and radioactivity from the footprint of TA-16-27 from a depth of 0 to 6 in. Ten of these samples will be additionally screened by D-Tech. The exact location of five laboratory samples will be biased to results from HE field screening or visual evidence of cracks or leaks in the building foundation. Barium values above background may also bias sample collection. In the absence of this evidence, stratified random sampling will be conducted

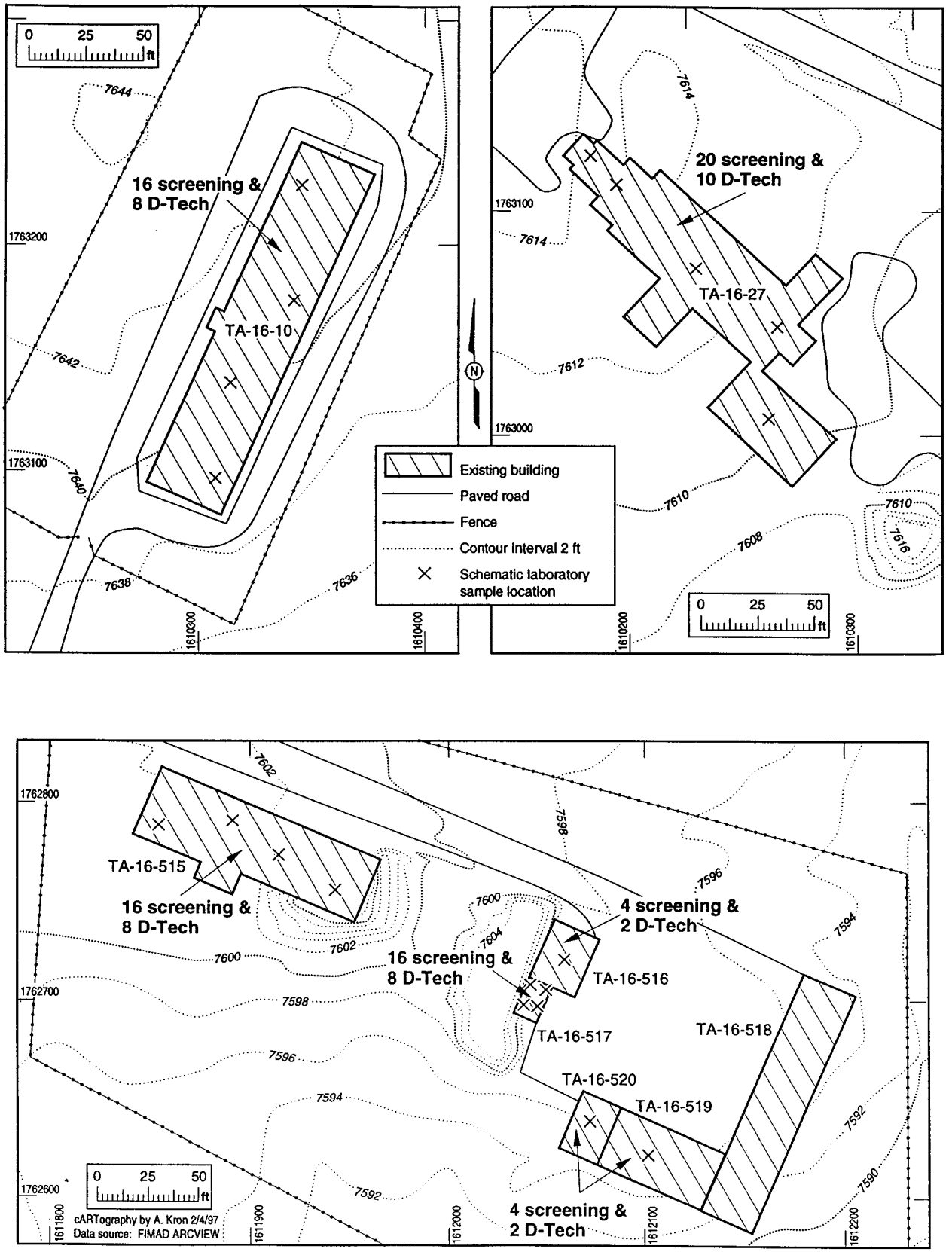


Figure 3.1.2-7. Schematic laboratory sampling locations for PRS 16-017.

as follows: one sample from the interior basement sump pit, one sample from the equipment room on the east side, one sample from the southeast section of TA-16-27 near the door, and two samples from the oven area on the northwest end of the building footprint.

- Sixteen samples will be collected and screened for HE by spot test, VOCs, metals by XRF, and radioactivity from the footprint of TA-16-515 and TA-16-517 at a depth of 0 to 6 in. Eight of these samples will be additionally screened by D-Tech. Four laboratory samples will be biased to cracks or stains in the floor, or in the absence of visual evidence, these samples will be collected in a stratified random pattern, with field screening and laboratory samples distributed evenly within each quadrant of the building. Four samples will be collected and screened for HE by spot test, VOCs, metals by XRF, and radioactivity from each of the following building footprints: TA-16-516, -519, and -520. Two of these samples will be additionally screened by D-Tech. One laboratory sample from each footprint will be biased to results from HE field screening samples collected in each quadrant of these structures. All samples will be collected from a depth of 0 to 6 in.

- Footprint samples will not be collected at TA-16-518. Any contamination associated with TA-16-518 will be detected by samples collected for PRS 16-013.

A total of 20 laboratory samples will be collected for PRS 16-017 in FY 97 (Figure 3.1.2-7). Samples will be analyzed for the COPCs previously presented in Table 1.1-1. Samples will be collected to a depth of 3 ft into tuff at a subset of the field screening locations for bounding purposes. This subset will not exceed 20% of the total of 20 laboratory samples. The subset will be guided by HE field screening results and barium field screening values. All other samples will be collected to a depth of 6 in. Four times that many will be screened using HE spot tests and XRF. Twice that many will be screened using D-Tech HE kits to bias the locations of the laboratory samples. In many cases, HE field screening results will be used to bias the location of laboratory samples. However, areas of soil contamination where field screening results with values above 50% of the cleanup level will be excavated and removed. Verification and bounding samples will be collected within the excavation to ensure that contamination above cleanup levels has been removed. Visual inspection of structures before D&D may also be used to bias the locations of laboratory samples if an insufficient number of HE field screening results are positive.

PRS 16-029(h2) will be extensively field screened (24 to 28 locations) for HE by spot test, VOCs, metals by XRF, and radioactivity (Figure 3.1.2-8). Twelve to fourteen of these samples will be additionally screened by D-Tech. Based on archival information, the pipe is not expected to extend farther than the approximately 100-ft north-south section found during prior work in the north end of PRS 16-029(h2). This clay drain pipe will be visually inspected during removal by D&D for the presence of cracks and obvious leak points. If no cracks or leak points are visible, HE field screening results will be used for biasing sample location. These locations will bias initial screening, although other locations may be screened as well. Soil in the PRS boundary will be removed based on the concentration of HE detected during field screening. A value of 50% of the cleanup level will be used to determine if soil should be removed. All soil samples will be collected to a depth of at least 24 in.

If no contamination is detected within the PRS 16-029(h2) boundary, 2 laboratory soil samples will be collected in the north-south pipe section, biased to pipe leak points, and one laboratory soil sample will be collected near former manhole TA-16-801. The entire sampling plan originally proposed for this PRS is composed of these 3 laboratory samples, selected from 10 screening samples. Additional laboratory sampling is described below. If contaminated soil is removed, two to three verification soil samples will be collected in the areas of soil removal or in the area of obvious cracks or leaks in the drain pipe. Two laboratory soil samples will be collected if the pipe or contaminated soil area does not extend to the area of the four former buildings. If the pipe or contaminated soil area does extend to the area of the four former buildings (i.e., more pipe is encountered), three laboratory soil samples will be collected. These two or three soil samples will include the furthest upstream sample with a positive HE field screening value, as required in the original sampling plan. Four laboratory soil samples will be collected in the part of PRS 16-029(h2) that encircles the former building sites. These four sample locations will be biased to the former building sump locations. In all, a total of six to seven laboratory samples will be collected within the PRS 16-029(h2) boundary. Twice that many D-Tech screening samples and four times that many HE spot test and XRF screening samples will be collected at this PRS. Samples will be analyzed for the COPCs previously presented in Table 1.1-1. A backhoe (or equivalent type of earth-moving equipment) will be used to excavate trenches at sump locations, if sample collection in the tuff is required.

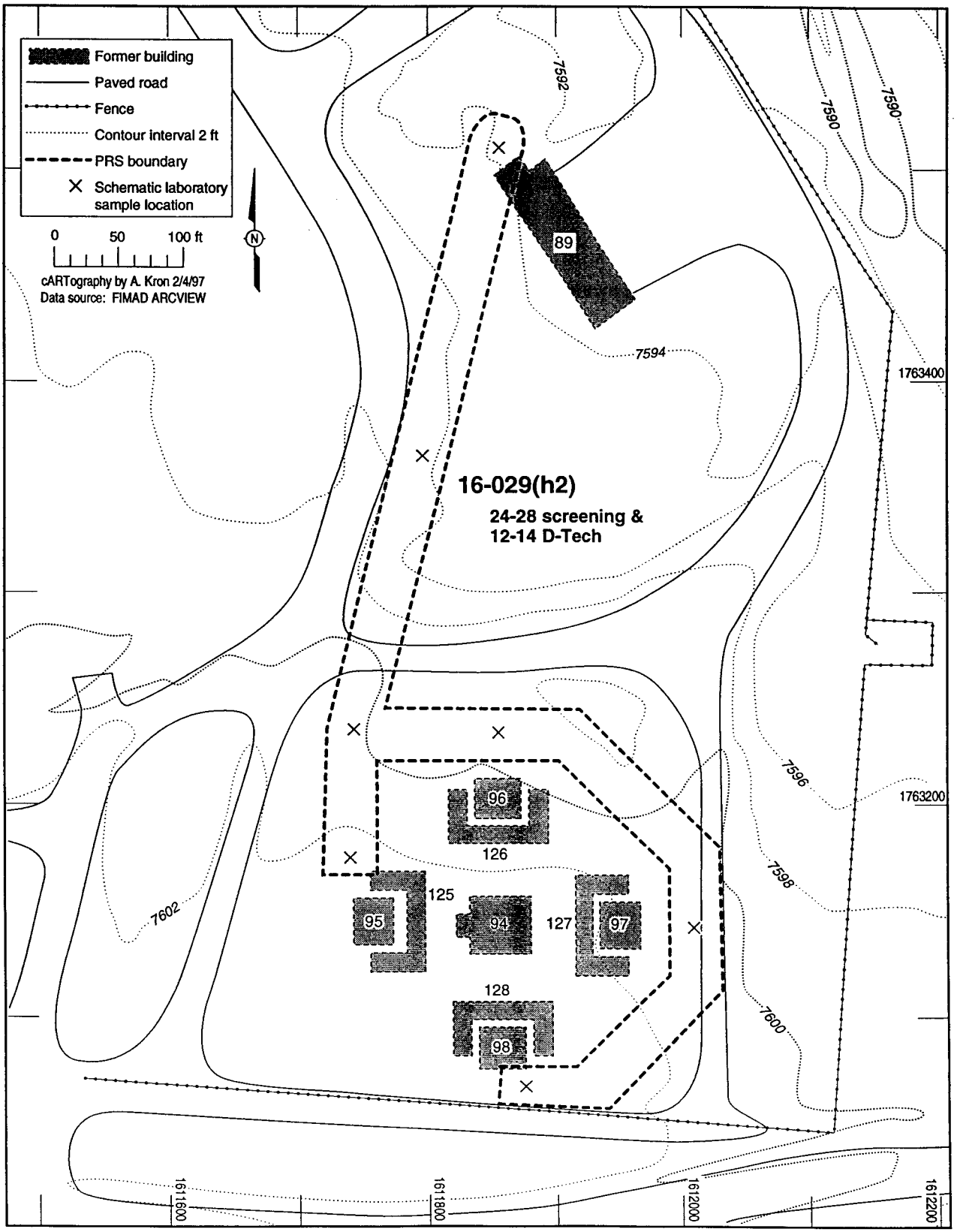


Figure 3.1.2-8. Schematic laboratory sampling locations for PRS 16-029(h2).

PRSs 16-006(h) and 16-029(g2) never had proposed sampling plans. Because these PRSs will be cleaned up during D&D, the following sampling plan is proposed. Two surface soil samples will be collected from each PRS and analyzed for HE, metals, SVOCs, and uranium. The two samples will be collected from different locations. Samples will be biased to stains or other visual indications of possible contamination, if present. Otherwise, for PRS 16-006(h), pump pit TA-16-526, and PRS 16-029(g2), pit TA-16-523, the two samples shall be collected from the center of two randomly selected quadrants. No field screening is proposed for these two PRSs due to their small size and the likelihood that they are not contaminated. Sampling locations for these PRSs were shown in Figure 3.1.2-1.

Table 3.1.2-1 lists all the field screening and verification sampling proposed at the PRSs in this plan.

3.2 Basis for Cleanup Levels

In order to derive target cleanup levels for use during this VCM, potential impacts of residual COPCs on both human health and the environment are considered. Risk-based cleanup levels, based on an evaluation of the potential exposure pathways and scenarios described in the following sections, are proposed. The primary objective in establishing cleanup levels for this VCM is to develop thresholds for site soil, so that risks from possible future exposures to residual contamination can be reduced to levels that are protective of human health and the environment.

3.2.1 Potential Exposure Pathways

The primary considerations when developing cleanup levels are to ascertain that site conditions and exposure pathways of concern are taken into account. Thus, it is always necessary to develop a conceptual site model to identify likely contaminant source areas, exposure pathways, and potential receptors.

Exposure pathways are the mechanisms through which an individual may come into contact with a chemical in the environment. Exposure pathways are influenced by environmental conditions, by the potential for the chemical to move from one medium (e.g., soil, water, or air) to another, and by

TABLE 3.1.2-1

SCREENING AND LABORATORY SAMPLES TO BE COLLECTED

PRS	HE SPOT TEST	HE D-TECH	XRF METALS	HE	URANIUM	METALS	BORON	VOCs	SVOCs	PCBs[a]
16-005(d)	20	10	20	3	3	3	—	3	3	—
16-006(g)	3	3	3	2	2	2	2	2	2	—
16-006(h)	8	4	8	2	2	2	—		2	—
16-013	10	5	5	2	2	2	—	2	2	—
16-017	80	40	80	20	20	20	20	20	20	20
16-025(x)	8	6	8	3	—	3	—	3	3	—
16-026(q)	120–160	60–80	60–80	30–40	30–40	30–40	—	30–40	30–40	—
16-029(g2)	8	4	8	2	2	2	—	—	2	—
16-029(h2)	28	14	28	6–7	6–7	6–7	—	6–7	6–7	—
16-029(w)	10	5	10	3	—	3	—	3	3	—
16-029(x)	108–124	54–62	54–62	27–31	27–31	27–31	27–31	27–31	27–31	27–31
16-031(c)[b]	—	—	—	—	—	—	—	—	—	—
16-031(d)	—	—	5	—	—	1	—	—	—	—

TABLE 3.1.2-1 (continued)

PRS	HE SPOT TEST	HE D-TECH	XRF METALS	HE	URANIUM	METALS	BORON	VOCs	SVOCs	PCBs[a]
16-034(p)	9	9	9	4	—	4	—	—	4	—
C-16-065	6	3	6	1	—	1	—	1	1	—
C-16-068	4	2	4	1	1	1	—	1	1	—
C-16-074	4	2	4	1	1	1	—	1	1	—
Main drainage	16	16	16	16	16	16	—	—	16	16

a. PCBs = polychlorinated biphenyls.

b. Samples for 16-031(c) are incorporated in the sampling for 16-029(x).

the general lifestyles and/or work activities of the potentially exposed population (e.g., construction work or residential activity). Although many potential pathways are possible, only a few may be complete and pose a potential risk to exposed populations. For a pathway to be complete, each of the following elements must exist:

- a source and mechanism for chemical release into the environment;
- a point of potential contact with the environment; and
- an exposure route at the contact point (i.e., inhalation, ingestion, or dermal contact).

3.2.1.1 Pathways for Residual Contamination

This area of TA-16 is flat, located away from steep drainages and canyon sides, and is covered with grasses and pine forest. If contaminated soils remain in place at these PRSs, the primary mechanisms available for transport of contaminants from their current location are erosion of soil and wind dispersion. Potential contaminants do not contact groundwater or surface water at these sites. A conceptual model for these sites with surface soil contamination was presented in the RFI Work Plan for OU 1082 (LANL 1993, 1094). The following potential human exposure pathways to surface soils were identified in the conceptual exposure model:

- incidental soil ingestion;
- dermal contact with contaminated soil; and
- inhalation of contaminated soil-derived particulates.

These three exposure pathways are conservatively considered potentially complete and will be considered in the derivation of cleanup levels for this VCM Plan. Due to the site-specific conditions at this part of TA-16 (e.g., depth to groundwater is greater than 500 ft and there is no direct contact with drainage areas or surface water), impacts to groundwater and ingestion of contaminated water are not evaluated as potential pathways.

3.2.1.2 Pathways During Remediation

Possible exposure pathways to workers involved with remediation activities at these PRSs are generally the same as those described in Section 3.2.1.1. Excavation activities may increase the potential for sediment transport and wind dispersion. Therefore, precautions will be taken to minimize these pathways during remediation and D&D activities. Appropriate dust suppression techniques will be used to prevent contaminants from becoming airborne. Plastic sheeting will be

used to cover the excavated area and excavated material to prevent rainwater and/or runoff from contacting potentially contaminated material. Best management practices (BMP), such as placement of hay bales in downstream drainage locations, will be implemented in collaboration with LANL group ESH-18 as part of storm water prevention program activities.

3.2.2 Future Land Use

The PRSs in this plan lie entirely on DOE-owned land. The area is removed from public access roads. Access to the area is limited to Q- and L-cleared personnel who have had site-specific HE training or to visitors escorted by cleared individuals with such training. In the future, the land will be used exclusively for LANL (industrial) operations, as stated in the Site Development Plan Annual Update 1995 (LANL 1995, 1376). Because TA-16 will remain dedicated to continued Laboratory operations into the future, only a continued laboratory exposure scenario in which the receptor is a generic, long-term industrial worker will be evaluated to derive cleanup levels.

3.2.3 Use of EPA Region IX PRGs for Industrial Soil

To simplify the derivation of cleanup levels for this VCM, it was decided to adopt the Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goals (PRGs) for industrial soil as cleanup levels. The decision to adopt these generic risk-based thresholds was driven by the fact that the conceptual model for the site directly matches the underlying assumptions used by Region IX to calculate industrial soil PRGs, and the generic industrial worker provides the most conservative characterization of a potential future receptor at the site.

Table 3.2.3-1 presents EPA Region IX PRGs for various COPCs under the continued laboratory operations exposure scenario. For comparative purposes only, Table 3.2.3-2 provides PRGs for the same COPCs under a residential scenario.

3.2.4 Proposed Cleanup Levels

The cleanup levels calculated in this VCM Plan are based on human health risks using an industrial land use exposure scenario. The equations and parameter values used in the calculations are identical to those specified in the Region IX PRG Table for industrial land use (EPA 1996, 1351)

For the purposes of this VCM, cleanup levels have been derived with a point of departure of 1E-6 level of risk for carcinogens and a hazard index of 0.1 for noncarcinogens. (The exceptions to this are the cleanup levels for beryllium and lead. The cleanup level for beryllium is based on a 1E-5 level of risk to establish a threshold above the background concentration range for this metal. The

TABLE 3.2.3-1
EPA REGION IX PRGs FOR INDUSTRIAL SOIL,
CONTINUED LABORATORY OPERATIONS SCENARIO

PRGs FOR VARIOUS RISK RANGES (mg/kg) INDUSTRIAL SOIL					
	CARCINOGENS			NONCARCINOGENS	
CHEMICAL	10-6	10-5	10-4	HI[a] = 1.0	HI = 0.1
Barium	—	—	—	100 000	10 000
Cadmium	—	—	—	850	85
Chromium (total)[b]	450	4 500	45 000	—	—
Copper	—	—	—	63 000	6 300
Cyanide	—	—	—	14 000	1 400
DNB mixture	—	—	—	68	6.8
DNT mixture	2.8	28	280	—	—
HMX	—	—	—	34 000	3 400
Lead[c]	—	—	—	1 000	1 000
Nickel	—	—	—	34 000	3400
RDX	17	170	1 700		
TNB	—	—	—	34	3.4
TNT	64	640	6 400	—	—

a. HI = Hazard index.
b. Total chromium values assumes 1/6 of total chromium is Cr(VI).
c. Lead cleanup level in industrial soil based on EPA Region VI guidance.

TABLE 3.2.3-2
EPA REGION IX PRGs FOR RESIDENTIAL SOIL, RESIDENTIAL SCENARIO

Please Note: This table presented for comparative purposes only.

PRSs FOR VARIOUS RISK RANGES (mg/kg) RESIDENTIAL SOIL					
	CARCINOGENS			NONCARCINOGENS	
CHEMICAL	10-6	10-5	10-4	HI[a] = 1.0	HI = 0.1
Barium	—	—	—	5 300	530
Cadmium	—	—	—	38	4
Chromium (total)[b]	210	2 100	21 000	—	—
Copper	—	—	—	2 800	280
Cyanide	—	—	—	1 300	130
DNB mixture	—	—	—	7	0.7
DNT mixture	0.65	6.5	65	—	—
HMX	—	—	—	3 300	330
Lead[c]	—	—	—	400	400
Nickel	—	—	—	1 500	150
RDX	4	40	400	—	—
TNB	—	—	—	3	0.3
TNT	15	150	1500	—	—

a. HI = Hazard index.
b. Total chromium values assumes 1/6 of total chromium is Cr(VI).
c. Lead cleanup level in residential soil based on EPA Region VI guidance.

cleanup level for lead is based on EPA Region VI guidance.) This conservative approach is adopted to account for the presence of multiple constituents and to be sure that residual risk will be within the EPA-acceptable risk range of 1E-4 to 1E-6 for carcinogens and less than a hazard index of 1 for noncarcinogens.

The following site-specific factors have also been considered in establishing cleanup levels for this VCM.

1. PRSs at TA-16 are located in a remote area that has highly controlled access for personnel. Therefore, the default exposure parameters for the long-term worker are highly conservative and represent an extreme upper bound estimate of potential risk.

2. Following remediation, residual contamination will be at depths below 2 to 5 feet, which are the estimated depths of the drain lines and sump bases. It is extremely difficult to envision a credible exposure scenario, either human health- or eco-risk-based, that would provide any long-term exposure to significant amounts of subsurface soil at these sites.

3. Both TNT and RDX are Class C rather than Class B carcinogens, so it is uncertain if they are carcinogenic to humans. Subpart S to RCRA recommended a 10-5 action level for Class C carcinogens (EPA 1990, 0432).

LANL recommends that the soil cleanup levels presented in Table 3.2.4-1 be applied for this VCM. The cleanup levels proposed for soil at these PRSs are protective of human health and the environment. For all contaminants, cleanup of the site to these levels will result in incremental risks well below EPA's target risk range.

3.3 Site Restoration

Following cleanup activities, areas of soil removal will be backfilled with clean soil, regraded, and revegetated. Native grass seed will be used to revegetate the areas disturbed by remediation activities.

TABLE 3.2.4-1
PROPOSED SOIL CLEANUP LEVELS FOR PRSs IN THIS PLAN

CHEMICAL	RECOMMENDED CLEANUP LEVEL (mg/kg)	RATIONALE/NOTES
Barium	10 000	HI[a] = 0.1
Beryllium	11	Risk = 10^{-5}
Cadmium	85	HI = 0.1
Chromium (total)[b]	450	Risk = 10^{-6}
Copper	6 300	HI = 0.1
Cyanide	1 400	HI = 0.1
DNB mixture	6.8	HI = 0.1
DNT mixture	2.8	Risk = 10^{-6}
HMX	3 400	HI = 0.1
Lead	1 000	EPA Region VI guidance
Nickel	3 400	HI = 0.1
RDX	17	Risk = 10^{-6}
TNB	3.4	HI = 0.1
TNT	64	Risk = 10^{-6}

a. HI = Hazard Index.
b. Total chromium value assumes 1/6 of total chromium is chromium (VI).

4.0 WASTE MANAGEMENT

4.1 Estimated Types and Volumes of Waste

Table 4.1-1 presents the types of waste expected and waste volume estimates. Waste soils generated by FU-3 during the VCM will be handled by the FU-3, not by D&D personnel.

TABLE 4.1-1
ESTIMATED WASTE TYPES AND VOLUMES

ITEM	WASTE TYPE	ANTICIPATED VOLUME
Sampling waste and personal protective equipment	Nonhazardous/nonradioactive	0.5 yd^3
Contaminated soils	Nonhazardous/nonradioactive	200 yd^3
Contaminated soils	Mixed	5 yd^3
Contaminated soils	Radioactive	5 yd^3
Contaminated soils	RCRA organic	135 yd^3
Decontamination water	Nonhazardous/nonradioactive	30 gal.

4.2 Method of Management and Disposal

All waste will be managed in accordance with the appropriate regulations. Secondary containment will be used for all liquid waste. Less-than-90-day storage areas are not anticipated.

5.0 DESCRIPTION OF CONFIRMATORY/VERIFICATION SAMPLING

All initial characterization samples representing material that is not subsequently removed will be used as verification samples. Areas that are excavated based on preliminary field screening or subsequent laboratory analysis will be resampled in order to complete the final set of verification samples stipulated.

All analytical results will be statistically compared with the appropriate industrial cleanup levels. Achievement of cleanup levels will be evaluated both by comparing individual measured values with the proposed cleanup levels and also, where measured values approach or exceed these levels, by calculating a 95% upper confidence limit (UCL) for the mean residual contamination in an appropriate exposure unit. The exposure units to be used, together with the minimum number of verification samples expected in each, are listed in Table 5.0-1. The UCL provides a conservative upper bound estimate of the average concentration in an exposure unit (EPA 1992, 1120). Only soil samples (not samples collected in tuff) are considered as verification samples.

TABLE 5.0-1
VERIFICATION SAMPLES IN EXPOSURE UNITS

PRS	Description	VCM sampling
V-Site Drainline and Lagoon (10 to 20 samples)		
16-029(x)	Drainline from V-Site sumps, outside V-Site fence, including swale	1 each in manholes 795, 796, 797; 3 to 5 between 797 and outfall; 2 surface, 2 interface, and 2 tuff from swale; 8 to 10 verification samples of which two are in tuff
V-Site West (13 samples)		
16-006(g)	Septic tank south of TA-16-515	2 in boundary
16-017	Building 515	4 in footprint
16-029(x)	Building 515 sumps and drainline to fence	2 in sump and 1 each in manholes 793 and 794
16-031(c)	Cooling tower	3 in boundary
V-Site East (15 samples)		
16-013	Storage area in V-Site courtyard	2
16-017	Buildings 516, 517, 518, 519, and 520	4 for Building 517 footprint, none for 518 (included in 16-013), 1 each for other structures
16-029(g2)	Pit used for shake tests of Fat Man device	2
16-006(h)	Steam heating pump pit south of TA-16-517	2

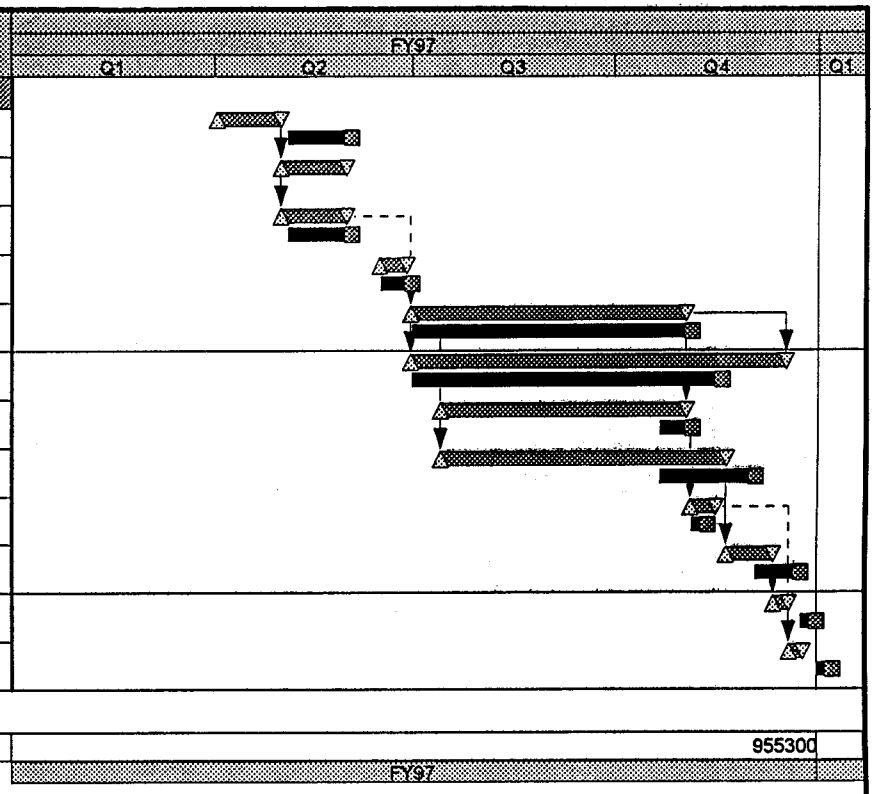
TABLE 5.0-1 (continued)

PRS	Description	VCM sampling
C-16-068	Unknown TA-16-522	1
C-16-074	Drum storage area at V-Site, east of TA-16-517	1
Building 100 (6 samples)		
16-025(x)	Electroplating lab, TA-16-100	3
16-029(w)	Drainline from TA-16-100 sump	3
Building 27 Southeast (11 to 21 samples)		
16-005(d)	Septic tank associated with TA-16-27	3 (some possibly in tuff)
16-026(q)	TA-16-27 drainage	6, with up to 10 verification samples
16-031(d)	Site of TA-16-27 cooling tower	1
C-16-065	Soil around drum storage platform near TA-16-27	1
Building 27 Northwest (15 to 18 samples)		
16-017	Building 27	5 in footprint
16-026(q)	TA-16-27 sumps (10)	2 per sump (one in tuff) and 3 to 4 in northwest drainage
Miscellaneous (14 to 15 samples)		
16-029(h2)	Drainline	2 to 3 from pipe and 1 near each sump
16-017	Building 10	4 samples in footprint
16-034(p)	Basement foundation	4

6.0 ESTIMATED TIME TO COMPLETE THE ACTION AND UNCERTAINTIES

The cleanup activities will require approximately four months to complete. The schedule could be affected by the results of the verification samples. If verification samples indicate more widespread contamination, further cleanup might be needed. Weather could also affect the schedule of cleanup activities. A schedule of individual activities is shown in Figure 6.0-1.

Activity ID	Activity Description	Original duration	Early start	Early finish	Budgeted cost	Cost account (11)
TA16: V SITE VCA						
A312509305	TA16:V SITE DEVELOP VCA PLAN/ISSUE DRAFT	20	02JAN97	30JAN97	48550.25	MA3V-5093
A31250930A	TA16:V SITE DEV.VCA PLAN additional scope	20	31JAN97	28FEB97	24311.21	MA3V-5093
A312509315	TA16:V SITE PREPARE FOR VCA	20	31JAN97	28FEB97	49667.18	MA3V-5093
A312509318	TA16:V SITE ISSUE A.A DRAFT/INC COMMENTS	10	17MAR97	28MAR97	13608.84	MA3V-5093
A312509330	TA16:V SITE VCA	88	31MAR97	01AUG97	280151.15	MA3V-5093
A312509338	TA16:V SITE WASTE MANAGEMENT	118	31MAR97	15SEP97	149185.00	MA3V-5093
A312509333	TA16:V SITE VERIFICATION SAMPLING	78	14APR97	01AUG97	107792.82	MA3V-5093
A312509334	TA16:V SITE OFFSITE LAB ANALYSIS	90	14APR97	19AUG97	170622.02	MA3V-5093
A312509337	TA16:V SITE RESTORE SITE + DEMOBILIZE	10	04AUG97	15AUG97	57536.55	MA3V-5093
A312509340	TA16:V SITE DEVELOPE VCA REPORT	15	20AUG97	10SEP97	42961.83	MA3V-5093
A312509345	TA16:V SITE LANL/DOE REVIEW OF VCA REPORT	5	11SEP97	17SEP97	4233.12	MA3V-5093
A312509350	TA16:V SITE ISSUE A.A DRAFT & INC COMMENTS	5	18SEP97	24SEP97	6680.20	MA3V-5093



Row	Group Name	
1	Total	955300

FY97

Project Start	01OCT89	Early Bar
Project Finish	31JAN03	target bar
Data Date	01OCT96	Progress Bar
Run Date	13MAR97	Critical Activity

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JA03

Sheet 1 of 1

LOS ALAMOS NATIONAL LABORATORY

FU#3 BASELINE STANDARD

FY97 REPLAN

7.0 ANNEXES

7.1 Risk-Based Cleanup Level Assumptions and Calculations

See the Environmental Protection Agency (EPA) Region IX Preliminary Remediation Goal (PRG) Tables for industrial land use (EPA 1996, 1351) for specific calculations. See Section 3.2 of this document for assumptions made in calculation.

7.2 RFI Analytical Results

With the exception of PRS 16-034(p), no PRS in this plan has RFI analytical results. The RFI analytical results associated with PRS 16-034(p) have been partially reproduced in this plan and are also available from the Facility for Information Management, Analysis, and Display (FIMAD), or upon request.

7.3 Implementation SOPs

See Environmental Restoration Project Standard Operating Procedures, Volumes I and II, November 17, 1993, Los Alamos National Laboratory (LANL 1993, 0875).

7.4 Quality Assurance Plan

See Quality Program Plan and Quality Assurance Project Plan for Environmental Restoration, February 1996 revision, Los Alamos National Laboratory.

7.5 Site-Specific Health and Safety Plan

See Attachment B.

7.6 Waste Management Checklist

See Attachment C.

7.7 VCM Checklist and Fieldwork Authorization Form

Signed Checklist and Fieldwork Authorization form provided on next page.

Voluntary Corrective Action (VCA)
Checklist and Fieldwork Authorization Form
PRS No. _____ HSWA or AOC

* SEE BELOW

✓ COPC(s) defined.

✓ Nature and extent defined or field screening method available to guide where not defined.

✓ Remedy is obvious.

✓ Time for removal is less than 6 months.

✓ Remedy is final.

✓ Land use assumptions straightforward.

* ✓ Treatment, Storage, Disposal Facilities are available for waste type and volume.

✓ Cleanup cost is reasonable for the planned action, and meets accelerated decision logic criterion for decision to proceed with VCA.

Explain criteria not checked above. * Stopping rules are established to ensure that generated wastes have an available TSD

Through reviewing the above criteria associated with this site, I believe that a VCA is the appropriate Accelerated Cleanup approach.

FPL [signature] Date 3-3-97

FPC Joseph H. Mose Date 3-4-97

The undersigned have reviewed the final plan and believe that it fully satisfies the appropriate Accelerated Cleanup approach.

FPL [signature] Date 3-12-97

FPC _____ Date _____

Through reviewing the VCA Plan, for site(s)_____, and believing that the above criteria have been met, I authorize the fieldwork to proceed.

DOE ER Program Manager _____ Date _____

* HSWA AOC EM/ER:96-134

HSWA	AOC
16-005(d)	C-16-065
16-006(g,h)	C-16-068
16-013	C-16-074
16-017	
16-025(x)	
16-026(q)	
16-029(g2,h2,w,x)	
16-031(c,d)	
16-034(p)	
S-Site Main Drainage	

7.8 Cost Estimate

Table 7.7-1 lists the estimated costs associated with the VCM.

TABLE 7.7-1
COST ESTIMATES

ACTIVITY	COST
Pre-field activities (field preparation and plan development)	$136 136
Cleanup	$280 151
Sampling/analytical	$278 414
Waste management disposal	$149 185
Post-field activities	$57 536
Final report	$53 874
Contingency	$47 809
Total Estimated Cost	$1 003 105

8.0 REFERENCES

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9.0 ATTACHMENTS

A. Approved Work Plan and VCM Plan Sample Comparison

B. Characterization Strategy Form

C. Site-Specific Health and Safety Plan

ATTACHMENT A. Approved Work Plan and VCM Plan Sample Comparison

Table A-1 presents a compilation of the approved Work Plan sampling for those PRSs where minimal or no soil cleanup is anticipated. Table A-2 presents a comparison of the approved Work Plan sampling to the augmented sampling proposed in this VCM Plan.

TABLE A-1
WORK PLAN SAMPLING PRSs - MINIMAL SOIL CLEANUP ANTICIPATED (ANTICIPATED NFAs)

PRS	Description	Screening Samples	Laboratory Samples
16-013	Storage area	5	2
16-025(x)	TA-16-100 electroplating bldg. footprint	8	3
16-029(w)	TA-16-100 sump/drainline	10	3
16-031(d)	TA-16-28 cooling tower	5	1
16-034(p)	TA-16-41 basement	9	3
C-16-065	Drum storage platform	5	1
C-16-068	TA-16-522 footprint	4	1
C-16-074	Drum storage	4	1

TABLE A-2
AUGMENTED WORK PLAN SAMPLING (CLEANUP LIKELY)

PRS	Description	Workplan Screening	VCM Screening[a]	Work Plan Lab	VCM Lab
16-017	Building foundations and structures	NA[b]	40/80	NA	20
16-026(q)	TA-16-27 sumps and drainages	27	60-80/ 120-160	14†	30-40
16-029(x) & 16-031(c)	TA-16-515 sump	20	120/60	9†	27-31
16-006(g)	Septic tank TA-16-527 for building TA-16-515	1	4/8	1	2
16-029(h2)	Drainline for TA-16-95, -96, -97, -98	10	12-14/ 24-28	3	6-7
16-005(d)	Septic tank TA-16-177 for building TA-16-27	5	10/20	3	3
16-006(h)	Pump pit TA-16-526	NA	0	NA	2
16-029(g2)	Pit TA-16-523	NA	0	NA	2

a. D-Tech/HE Spot test
b. NA = No sampling in original Work Plan
† 16-026(q) had 4 samples before receipt of the NOD; 16-029(x)/16-031(c) had 7 samples.

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CHARACTERIZATION STRATEGY FORM

OU Number	PRS/SWMU Numbers	Title
OU 1082	V-Site, GMX-3, Administrative Area	VCA, Phase I & II
	16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p), C-16-065, C-16-068, C-16-074, 16-025(g-j,d,n), and 16-029(m-p).	

Name: Linda Fluk	**Date:** 02/14/97
FPL: Roy Michelotti	**WMC:** Lynn Kidman
Type of Activity: VCA, Phase I & II	

Site Description: Site includes PRSs at V-Site, GMX-3, and the administrative area at TA-16. Abandoned buildings include: TA-16-27, TA-16-10, TA-16-515, TA-16-516, TA-16-517, TA-16-518, TA-16-519, and TA-16-520. Potential release sites (PRSs) include: 16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p) 16-025(g-j,d,n), and 16-029(m-p). Areas of concern (AOCs) include: C-16-065, C-16-068, and C-16-074. Refer to Figures for site locations.

V-Site was constructed in 1944 to conduct tests involving handling, loading, shake-testing, and cold-testing of mock-ups of the atomic bomb, Fat Man. A mock-up of the bomb bay of a B-29 was erected at the site for that purpose. The structures TA-16-515 (V-1, V-2) and TA-16-517 (a laboratory) were constructed at the site in 1944. V-Site was expanded in spring 1945 with the construction of TA-16-516, TA-16-519, and TA-16-520. TA-16-519 and TA-16-520 were used for varnishing and assembly of Fat Man mock-ups. In July 1945, final testing of the fit of the Trinity Device was performed in TA-16-516. At that time, the site was remodeled for testing explosive lenses, inner charges of implosion devices, and for final process work on explosive parts. An x-ray system was installed to inspect explosive charges.

The GMX-3 area, including TA-16-27 and surroundings structures was used for HE processing from 1944 to the early 1950s. Construction of TA-16-27 was completed in May 1945. The building was the main production casting facility for S-Site through 1953, when TA-16-300 and TA-16-302 were completed, although casting was stopped temporarily in 1946 due to deterioration of the building. Full-scale lenses for nuclear devices were cast in this building. After casting operations were moved into the 300-Line in the early 1950s, TA-16-27 was used as a warehouse. The sumps and drain lines for this building were removed in 1968. In 1970 the building was abandoned. At that time, the building was surveyed for radioactive contamination, chemical contamination, and HE contamination. One piece of equipment was mildly contaminated with radioactivity, presumably from depleted uranium, and the building was extensively HE contaminated.

Building TA-16-10 is located in the administrative area used by S-Site groups (X-3, GMX-2, GMX-3) primarily for activities that did not involve HE processing. Construction of the area began in early 1944 and continued until early 1950s. It was used as a warehouse, but casting molds were washed out in the north end of the building. Therefore, it is possible the structure is contaminated with HE.

A concrete foundation will be removed from PRS 16-034(p) as part of ER work.

Waste Description and Volume Estimate:

Contaminated soil waste may be excavated from beneath and adjacent to the structures removed by D&D. Drill cuttings may be generated from approximately three boreholes within a pond area. Sample analysis residues will be generated from on-site colorimetric and immunoassay screening analyses. Investigation-derived wastes will be generated from decontamination, and RFI sampling activities. Concrete wastes will be generated from the removal of the PRS 16-034(p) foundation. The investigation and remediation will be conducted in coordination with D&D activities (D&D will have a separate CSF).

CHARACTERIZATION STRATEGY FORM

OU Number	PRS/SWMU Numbers	Title
OU 1082	V-Site, GMX-3, Administrative Area	VCA, Phase I & II
	16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p), C-16-065, C-16-068, C-16-074, 16-025(g-j,d,n), and 16-029(m-p).	

Waste Description and Volume Estimate (cont.):

Description	Waste Types	Volume Estimates
soil	HE-contaminated	5 yd^3;
soil	radioactive	5 yd^3;
soil	mixed	5 yd^3
soil	hazardous	5 yd^3;
sample residues	hazardous	30 gal
decon liquid	non-haz, non-rad	100 gal
decon liquid	HE-contaminated	50 gal
RFI-derived	municipal refuse	2 yd^3
concrete	municipal refuse	50 yd^3

Characterization Strategy:

Characterization for RCRA Waste Codes Applicability:

Soil wastes will be characterized based on laboratory analytical results from direct waste samples. All other wastes will be characterized based on corresponding soil analytical results using conservative estimates for soil content in the wastes or a direct analysis of the wastes. Sample residues will also be characterized based on types and amounts of solvents in the waste. All wastes that are decontaminated using approved and proven procedures will be characterized as non-hazardous based on acceptable knowledge.

Characterization for Radioactivity:

Soil, concrete, and RFI-derived wastes will be analyzed for radioactivity when generated in locations where radioactive contamination is suspected. These results, or direct analytical results, will be used to derive the radioactivity of sample residues and decon liquids also generated from these areas. Evaluation for radioactivity will conducted using a beta-gamma sodium iodide detector following the procedures established in LANL-ER-SOP 10.07, Field Monitoring for Surface and Volume Radioactivity Levels.

Preliminary RCRA Determination:

☐ No 90-Day Storage Requirement (non-RCRA)

☒ **90-Day Storage Requirement (RCRA)**

All RCRA wastes will be stored/handled in accordance with 20 NMAC Section 262.11. Wastes will be stored in the Satellite Storage Area (SSA) while operations at the site continue until the total volume of wastes at the SSA exceeds 55 gallons. Secondary containment will be provided for liquid wastes.

Soil will be stockpiled temporarily in separate piles or drummed in waste storage areas depending on if it is a waste and the waste type.

CHARACTERIZATION STRATEGY FORM

OU Number	PRS/SWMU Numbers	Title
OU 1082	V-Site, GMX-3, Administrative Area	VCA, Phase I & II
	16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p), C-16-065, C-16-068, C-16-074, 16-025(g-j,d,n), and 16-029(m-p).	

Analyte Suite: Soil Wastes

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge		
			Existing Information		Data from Site Characterization
			Present	Absent	
Volatile Compounds	8260	☑	☐	☐	☐
Semi-Volatile Compounds	8270	☑	☐	☐	☐
Organic Pesticides and PCBs	8080	☑[2]	☐	☐	☐
Inorganic Compounds	XRF/6010	☑	☐	☐	☐
High Explosive Compounds	8330	☑	☐	☐	☐
Gross Alpha	SOP 10.07	☐	☐	☐	☐
Gross Beta	SOP 10.07	☑[2]	☐	☐	☐
Gross Gamma	SOP 10.07	☑[2]	☐	☐	☐
Tritium[1]		☑	☐	☐	☐
Asbestos		☐	☐	☑	☐
TCLP					
Metals	SW 846	☑[3]	☐	☐	☐
Organics	SW 846	☑[3]	☐	☐	☐
Pesticides, herbicides, fungicides	SW 846	☑[3]	☐	☐	☐
Uranium	Alpha Spec	☑[2]	☐	☐	☐
Isotopic Plutonium	Alpha Spec	☐	☐	☑	☐

[1] If "Absent" is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.

[2] If the waste was generated from an area suspected of containing this constituent.

[3] TCLP analyses may be run from a direct sample of the waste if total concentration of a TC constituent exceeds 20 times the corresponding TC level.

CHARACTERIZATION STRATEGY FORM

OU Number	PRS/SWMU Numbers	Title
OU 1082	V-Site, GMX-3, Administrative Area	VCA, Phase I & II
	16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p), C-16-065, C-16-068, C-16-074, 16-025(g-j,d,n), and 16-029(m-p).	

Analyte Suite: Concrete

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge		
			Existing Information		Data from Site Characterization
			Present	Absent	
Volatile Compounds	8260	☐	☐	☐	☑
Semi-Volatile Compounds	8270	☐	☐	☐	☑
Organic Pesticides and PCBs	8080	☐	☐	☑	☐
Inorganic Compounds	XRF/6010	☐	☐	☐	☑
High Explosive Compounds	8330	☐	☐	☐	☑
Gross Alpha	SOP 10.07	☐	☐	☑	☐
Gross Beta	SOP 10.07	☐	☐	☑	☐
Gross Gamma	SOP 10.07	☐	☐	☑	☐
Tritium[1]		☐	☐	☐	☑
Asbestos		☐	☐	☑	☐
TCLP	SW 846				
Metals	SW 846	☑[3]	☐	☐	☐
Organics	SW 846	☑[3]	☐	☐	☐
Pesticides, herbicides, fungicides	SW 846	☑[3]	☐	☐	☐
Uranium	Alpha Spec	☐	☐	☑	☐
Isotopic Plutonium	Alpha Spec	☐	☐	☑	☐

[1] If "Absent" is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.

[2] If the waste was generated from an area suspected of containing this constituent.

[3] TCLP analyses may be run from a direct sample of the waste if total concentration of a TC constituent exceeds 20 times the corresponding TC level.

CHARACTERIZATION STRATEGY FORM

OU Number	PRS/SWMU Numbers	Title
OU 1082	V-Site, GMX-3, Administrative Area	VCA, Phase I & II
	16-005(d), 16-006(g,h), 16-017, 16-025(x), 16-026(q), 16-029(g2, h2, w, x), 16-031(c,d), 16-013, 16-034(p), C-16-065, C-16-068, C-16-074, 16-025(g-j,d,n), and 16-029(m-p).	

Analyte Suite: Decon Liquids

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge		
			Existing Information		Data from Site Characterization
			Present	Absent	
Volatile Compounds	8260	☐	☐	☐	☑
Semi-Volatile Compounds	8270	☐	☐	☐	☑
Organic Pesticides and PCBs	8080	☐	☐	☐	☑
Inorganic Compounds	XRF/6010	☐	☐	☐	☑
High Explosive Compounds	8330	☐	☐	☐	☑
Gross Alpha	SOP 10.07	☐	☐	☐	☐
Gross Beta	SOP 10.07	☐	☐	☐	☑
Gross Gamma	SOP 10.07	☐	☐	☐	☑
Tritium[1]		☐	☐	☐	☑
Asbestos		☐	☐	☑	☐
TCLP	SW 846				
Metals	SW 846	☑[3]	☐	☐	☐
Organics	SW 846	☑[3]	☐	☐	☐
Pesticides, herbicides, fungicides	SW 846	☑[3]	☐	☐	☐
Uranium	Alpha Spec	☐	☐	☐	☑
Isotopic Plutonium	Alpha Spec	☐	☐	☑	☐

[1] If "Absent" is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.

[2] If the waste was generated from an area suspected of containing this constituent.

[3] TCLP analyses may be run from a direct sample of the waste if total concentration of a TC constituent exceeds 20 times the corresponding TC level.

Signatures:

ER Waste Management Coordinator

Waste Management Representative

Form Author

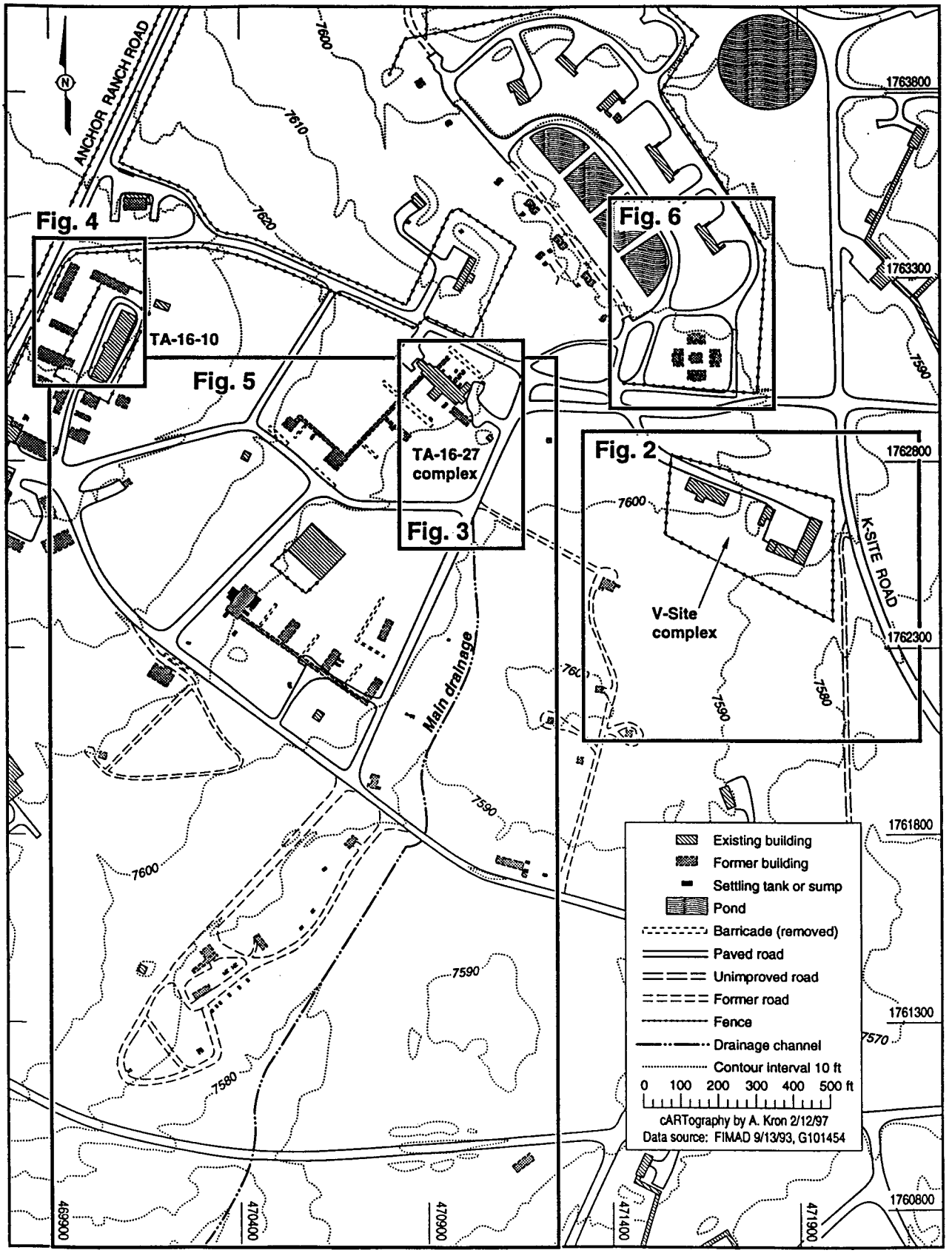

Fig. 1. Index to PRS location maps.

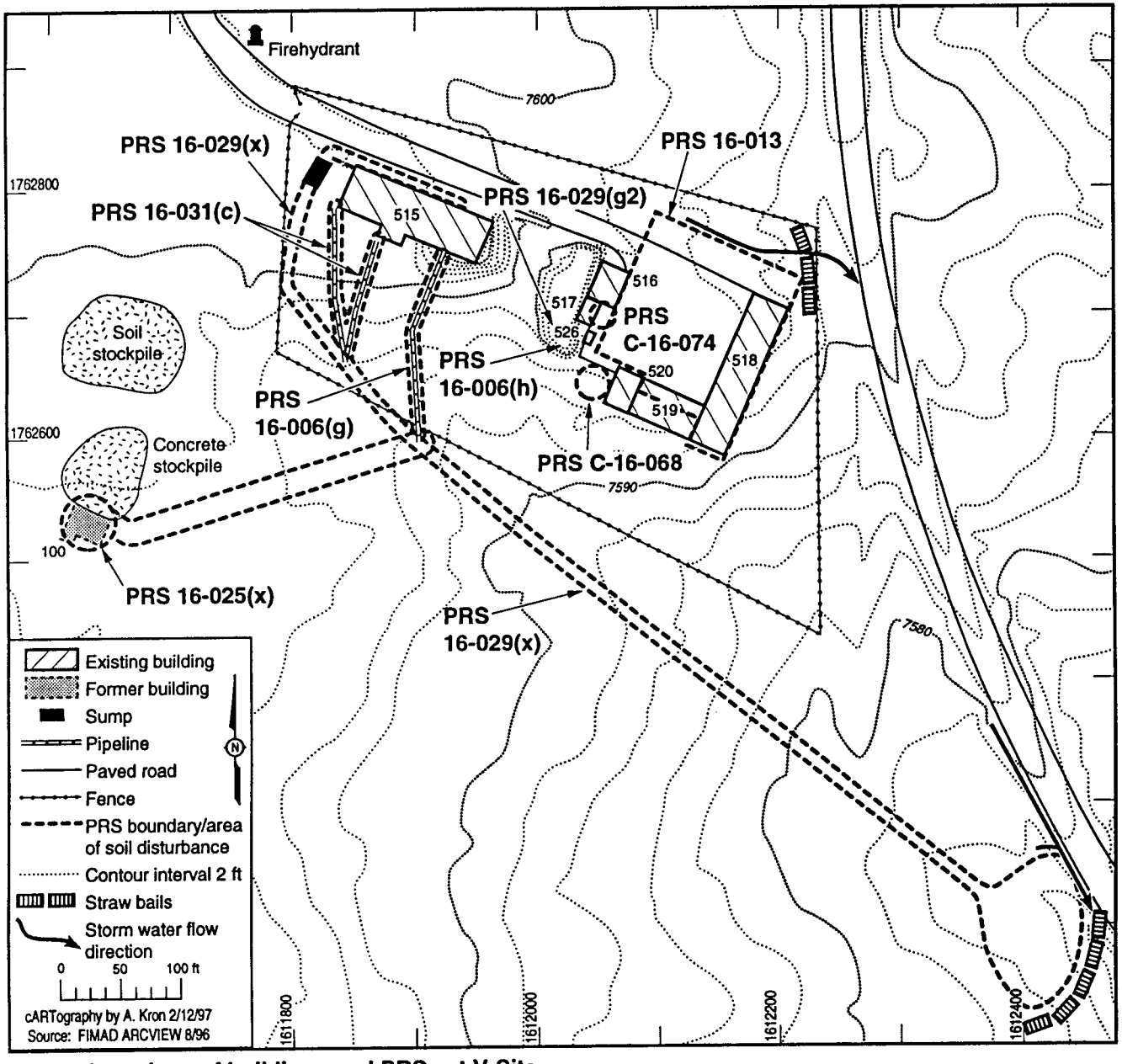

Fig. 2. Locations of buildings and PRSs at V-Site.

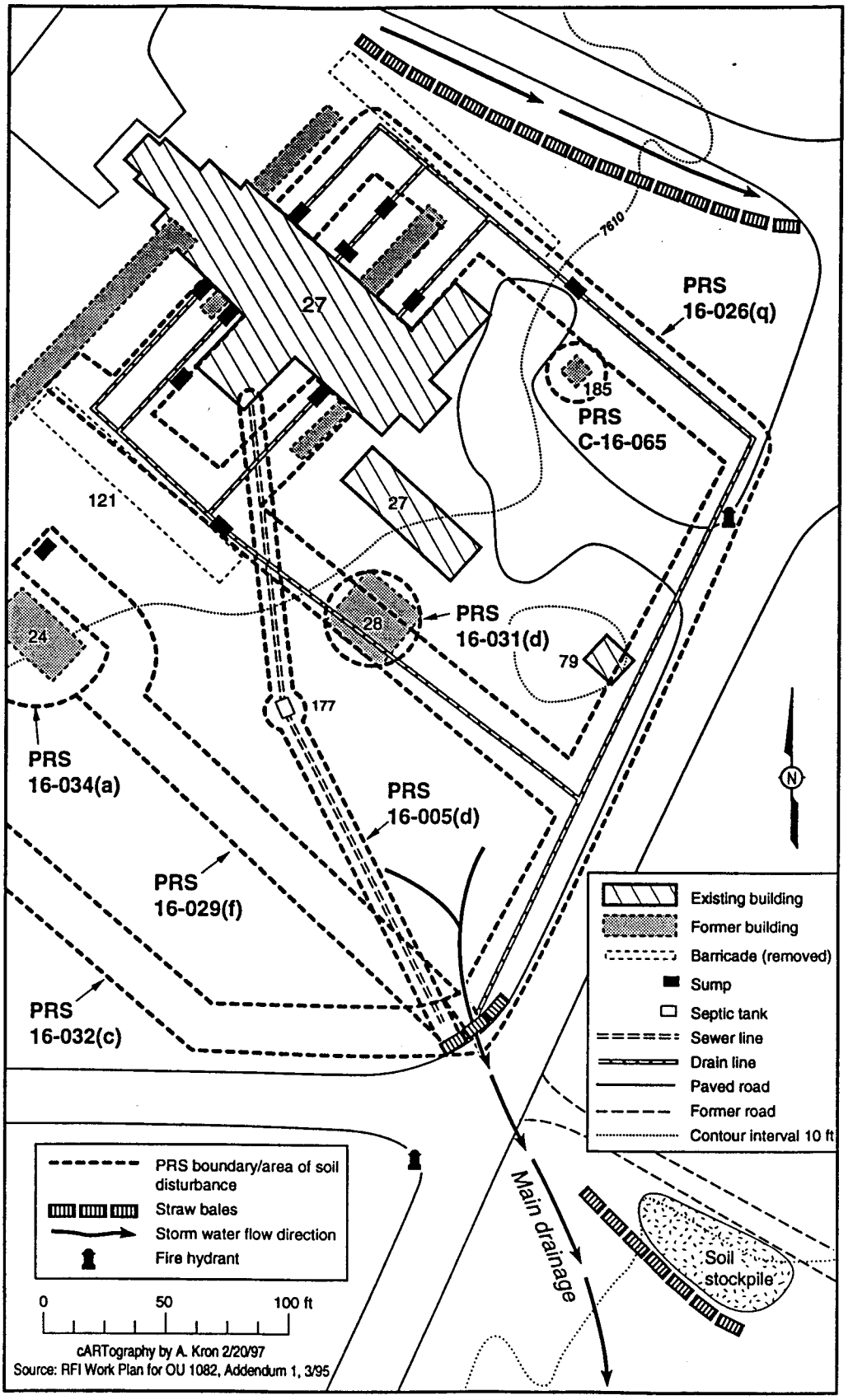

Fig. 3. Locations of Building TA-16-27 and PRSs at GMX-3 central.

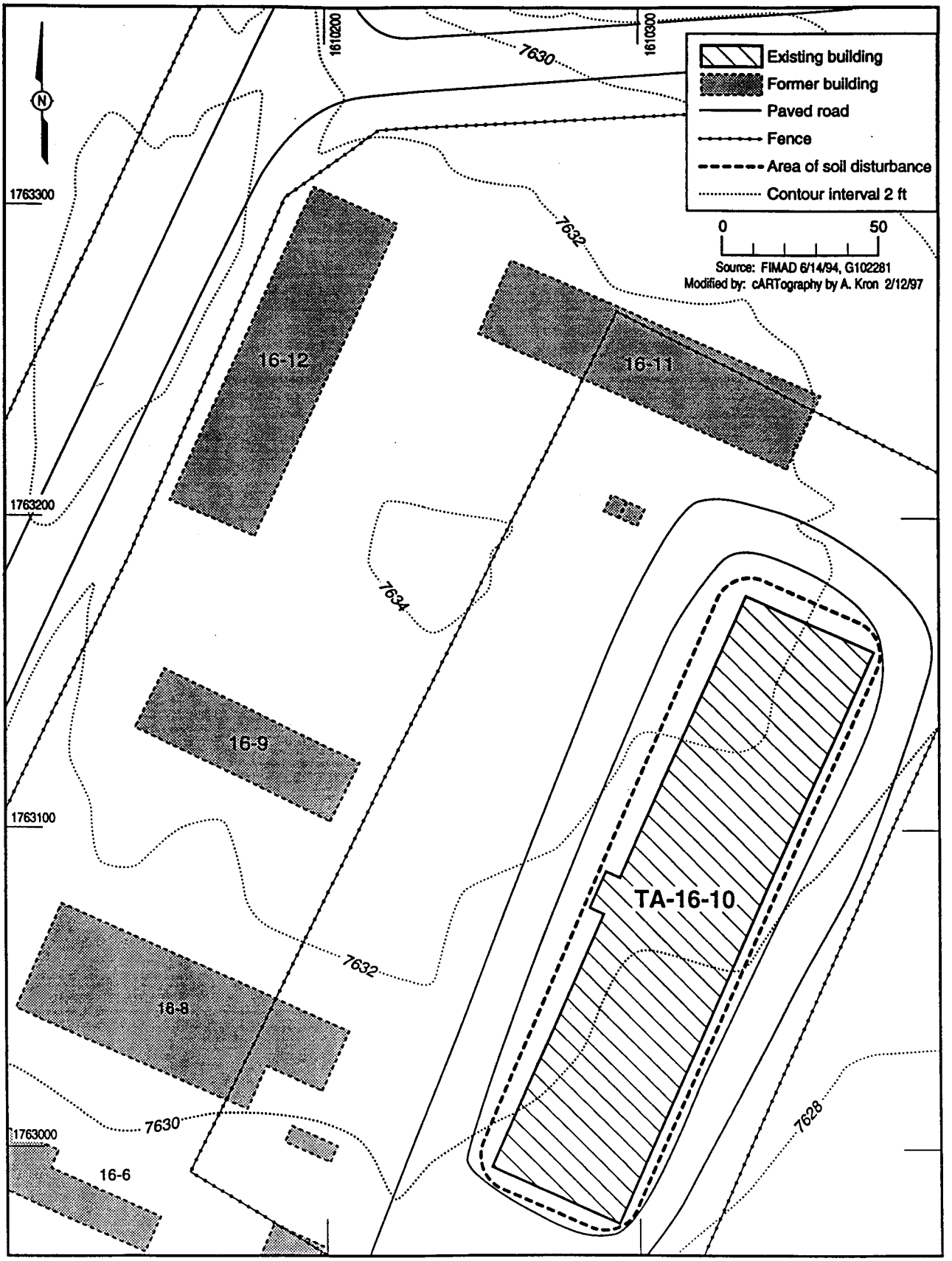

Fig. 4. Location of Building TA-16-10 at the administration area.

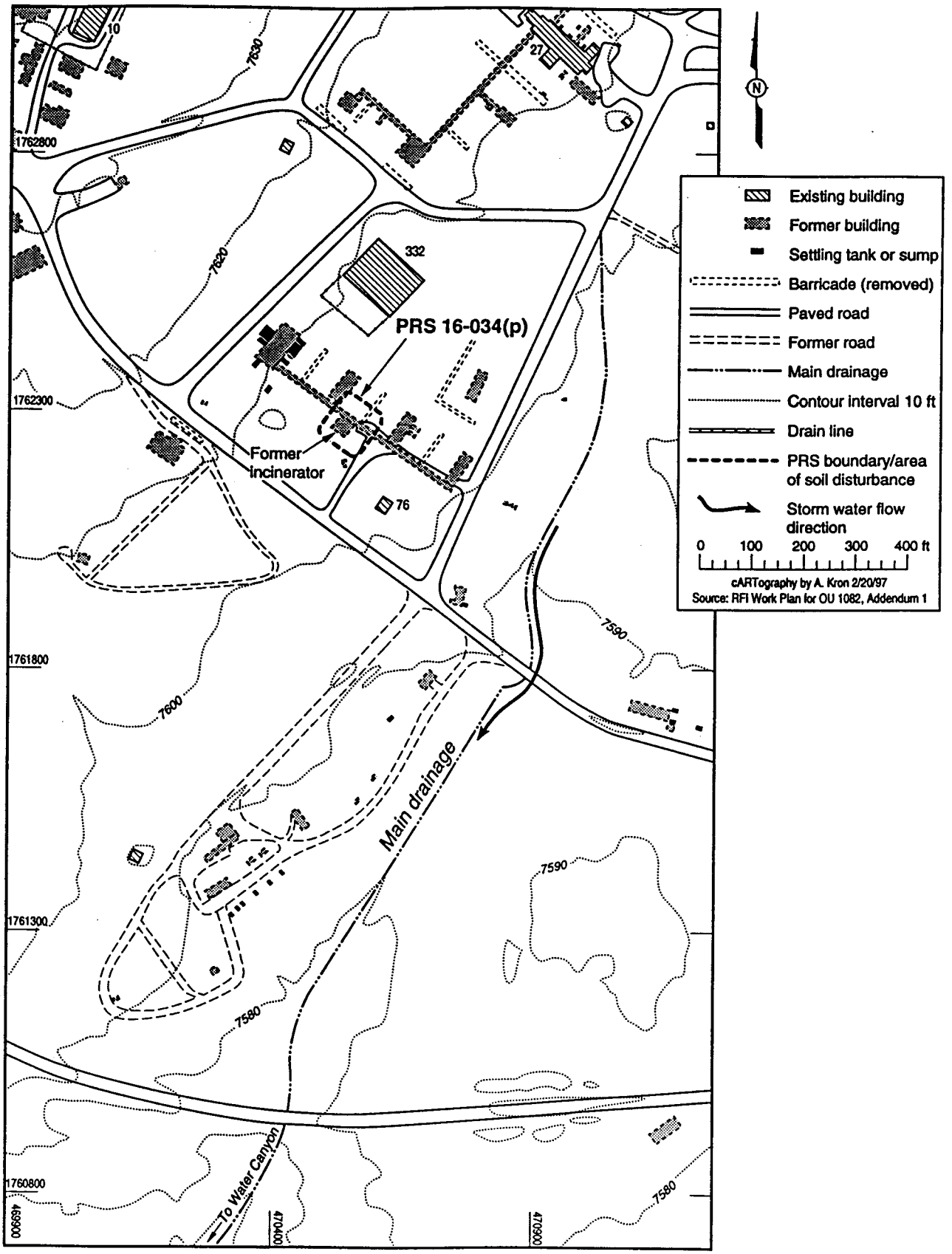

Fig. 5. Location of the main drainage and incinerator at GMX-3.

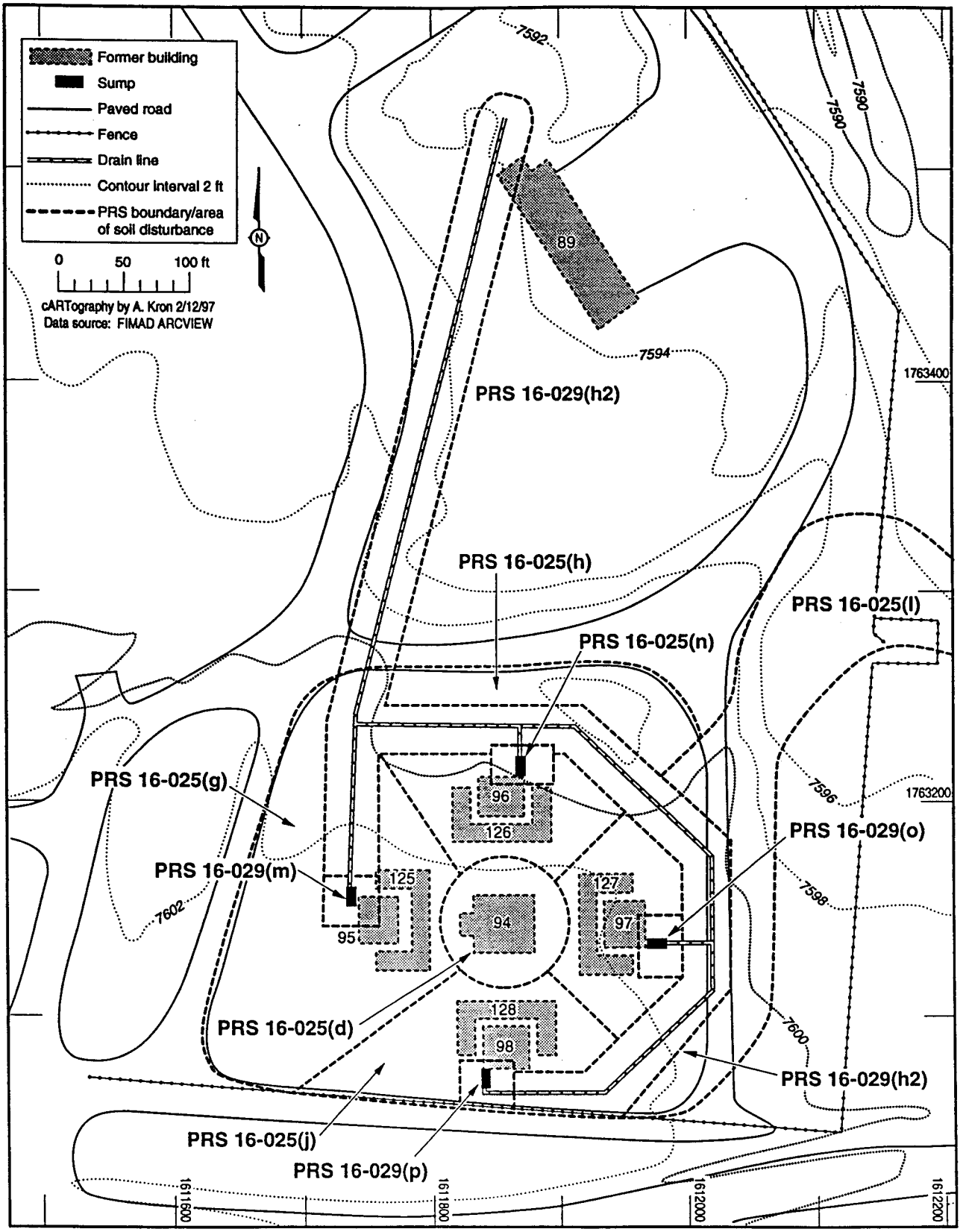

Fig. 6. Locations of drain line PRSs at GMX-3.

ATTACHMENT C. Site Specific Health and Safety Plan

LANL ER PROJECT
SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project Title: Voluntary Corrective Action (V-Site, GMX-3, and Administrative Area)

SSHASP No.: 163

TA: 16

This plan addresses the health and safety criteria to be followed during VCA activities associated with the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL)

Reviewed and Approved by:

Signature	Name/Title	Company	Date
Ivan Wachler	Ivan Wachler/ESH-5 Rep	ESH-5	2/21/97
Field Unit Health and Safety (H&S) Representative (ESH-5)			
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Health Physics Operations (ESH-1)			
	Roy Michelotti/FPL	LANL/CST-18	
Field Project Leader			
	Lynn Kidman/FTM	ICF Kaiser	
Field Team Manager			
	Dan Macdonell/Facility ESH	LANL/ESA-FM	
TA-16 Facility HS Representative			
Scott Wimer	Scott Wimer/Subcontractor HS	ICF Kaiser	2/21/97
Subcontractor HS			
	Clark Judy/Subcontractor HS	MK	
Subcontractor HS			
	/Subcontractor HS		
Excavation Subcontractor HS			

The comments of the above reviewers have been incorporated as stipulated or resolved with written record and copy to the respective reviewer.

Plan Preparer Name/Signature	Company	Date	Mail Stop	Phone
Ken H. McFadden/	MK		M767	662-7300

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LIST OF ACRONYMS and ABBREVIATIONS

ACGIH ..... American Conference of Governmental Industrial Hygienists
ALARA ..... As Low As Reasonably Achievable
AL ..... Action Level
ANSI ..... American National Standards Institute
APR ..... Air-Purifying Respirator
AR ..... Administrative Requirements
ATM ..... Atmosphere
°C ..... Degrees Centigrade
CFR ..... Code of Federal Regulations
CGI ..... Combustible Gas Indicator
CP ..... Competent Person
CPR ..... Cardiopulmonary Resuscitation
CRZ ..... Contamination Reduction Zone
DAC ..... Derived Air Concentration
dBA ..... Decibels (A-Weighted Scale)
DOE ..... U.S. Department of Energy
DOT ..... U.S. Department of Transportation
DPL ..... Decommissioning Project Leader
EPA ..... U.S. Environmental Protection Agency
ER ..... Environmental Restoration
ESH ..... Environmental, Safety and Health
ESH-1 ..... Health Physics Operations Group
ESH-2 ..... Occupational Medicine Group
ESH-5 ..... Industrial Hygiene and Safety Group
ESH-12 ..... Policy and Program Analysis Group
eV ..... Electron Volts
EZ ..... Exclusion Zone
°F ..... Degrees Fahrenheit
Fibers/cc ..... Fibers Per Cubic Centimeter
FID ..... Flame Ionization Detector
FPL ..... Field Project Leader
FTL ..... Field Team Leader
FTM ..... Field Team Manager
GET ..... General Employee Training
HASP ..... Health and Safety Plan
HAZWOPER ..... Hazardous Waste Operations
HEPA ..... High Efficiency Particulate Air
HPT ..... Health Protection Technician
HS ..... Health and Safety
IARC ..... International Agency for Research on Cancer
IDLH ..... Immediately Dangerous to Life or Health
IHT ..... Industrial Hygiene Technician
IP ..... Ionization Potential
JS ..... Job Superintendent
LAMC ..... Los Alamos Medical Center
LANL ..... Los Alamos National Laboratory
LEL ..... Lower Explosive Limit
LP ..... Laboratory Procedure
mg/kg ..... Milligrams Per Kilogram
mg/m^3 ..... Milligrams Per Cubic Meter
mm ..... Millimeters
MSDS ..... Material Safety Data Sheet

MUC ..... Maximum Use Concentration
NIOSH ..... National Institute for Occupational Safety and Health
NRR ..... Noise Reduction Rating
OSHA ..... Occupational Safety and Health Administration
PAH ..... Polycyclic Aromatic Hydrocarbons
PEL ..... Permissible Exposure Limit
PF ..... Protection Factor
PID ..... Photoionization Detector
PNA ..... Polynuclear Aromatics
PPE ..... Personal Protective Equipment
PRS ..... Potential Release Site
RCT ..... Radiological Control Technician
RMMA ..... Radioactive Materials Management Area
RSP ..... Radiological Screening Personnel
RWP ..... Radiological Work Permit
SC ..... Spill Containment
SLM ..... Sound Level Meter
SOP ..... Standard Operating Procedures
SSHASP ..... Site-Specific Health and Safety Plan
SSO ..... Site Safety Officer
SUP ..... Supervisor
SWMU ..... Solid Waste Management Unit
SWP ..... Special Work Permit
SZ ..... Support Zone
TA ..... Technical Area
TLD ..... Thermoluminescent Dosimeter
TLV ..... Threshold Limit Value
TWA ..... 8-Hour Time-Weighted Average

1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (SSHASP) has been developed for the Environmental Restoration (ER) Project at the Los Alamos National Laboratory (LANL) to comply with applicable federal and state occupational health and safety (HS) requirements, including those of the U.S. Department of Energy (DOE). The DOE requires LANL to comply with the federal Occupational Safety and Health Administration (OSHA) requirements, although operations at LANL are not subject to the jurisdiction of OSHA. The ER Project has developed a generic Health and Safety Plan, the ER Project HASP, which establishes HS information and requirements applicable to ER field operations project wide. In addition to the HASP, this SSHASP establishes site-specific HS information and requirements applicable to the scope of work described in Section 2.

ER participants are responsible for conducting work in accordance with applicable regulations. The term "ER participants" refers to anyone performing ER work, including LANL, subcontractors to LANL and their lower-tier contractors, consultants, and agents. In some cases in this document, LANL has chosen to invoke OSHA and LANL requirements which ordinarily may not apply to ER field operations (e.g., OSHA's general industry standards in Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910]). These choices were made on a case-by-case basis to maintain consistency with LANL's ALARA policy and to clarify LANL's expectations with regard to interpretable requirements of the multiple agencies governing ER work. Where there is concern that implementation of work orders or HS requirements would conflict with contract terms, or could unreasonably compromise the safety or health of an individual or the environment, such concerns should be brought to the attention of the Contract Administrator and the Field Unit HS Representative immediately. Failure to comply with terms of HS plans may constitute cause to stop activity or for issuance of a stop work order as specified in Section 3.4.2 of the HASP without cost or penalty to LANL.

This SSHASP shall be reviewed and approved in accordance with Section 1.2 of the HASP. Once this SSHASP has been approved, revisions will be tracked using a SSHASP modification form (Appendix B of the HASP) per Section 1.3 of the HASP. Modifications to this SSHASP may require a change to the terms or scope of a subcontract. Completion of a SSHASP modification form is <u>not</u> the means for modifying the scope or terms of the project contract. To modify a contract, the Subcontractor shall notify the Contract Administrator and Field Unit HS Representative under the changes clause and shall not proceed with the change until a change order has been mutually agreed between the parties, or unless unilateral direction is given by the Contract Administrator.

The completion of this VCA will involve the use of D&D subcontractor(s) for removal and disposal of several buildings and underground structures. It is expected that the ER work associated with this VCA, as listed in Table 2-4 of this SSHASP, will be performed separately (i.e., time and distance) from D&D activities. In the unlikely event of an ER field team member(s) needing access to a D&D controlled work area (i.e., construction zone, exclusion zone, contamination reduction zone), such access shall be coordinated through the ESH-5 Representative. Based on this expectation, this SSHASP only addresses the health and safety requirements for the ER work associated with this VCA.

2.0 BACKGROUND INFORMATION

This section provides site-specific background information for this project in accordance with Section 2 of the HASP. The project title, location, and objective as well as the classification and type of work are provided in Table 2-1. The site description and scope of work are provided in Tables 2-2 and 2-3 respectively.

TABLE 2-1 PROJECT DESCRIPTION
Project Title: Voluntary Corrective Action (V-Site, GMX-3, and Administrative Area)
Project Location: TA-16
Project Objective: Site characterization, remediation and restoration.
Potenital Release Sites (PRS's): 16-005(d), 16-006(g,h), 16-013, 16-017, 16-025(x), 16-026(q), 16-029(g2,h2,w,x) and 16-031(c,d), 16-034(p)
Areas of Concern (AOC): C-16-065, C-16-068, and C-16-074
Non-PRS/AOC: Main Drainage (MD)
Classification of Work: Voluntary Corrective Action
Type of Work: Intrusive-characterization using a backhoe and drilling rig.
Work Description: This project involves the collection of soil samples before and/or after structures/drain lines are decommissioned. Soil samples will be analyzed on site and confirmation samples will be sent off site for analysis. Contaminated soil will be excavated and disposed.

Table 2-2
Site Description

Potential Release Sites and Areas of Concern Associated with V-Site include: 16-006(g), 16-006(h), 16-013, 16-017, 16-025(x), 16-029(g2), 16-029(h2), 16-029(w), 16-029(x), 16-031(c), C-16-068, and C-16-074
Potential Release Sites and Areas of Concern Associated with GMX-3 include: 16-005(d), 16-017, 16-026(q), 16-031(d), 16-034(p), C-16-065, and Main Drainage (MD)
Potential Release Sites and Areas of Concern Associated with the Administrative Area include: 16-017

Descriptor	16-005(d)	16-026(q)	16-031(d)	16-006(g)	16-006(h)	16-013	16-017	16-025(x)	16-029(g2)	16-029(h2)	16-029(w)	16-029(x)	16-031(c)	16-034(p)	C-16-065	C-16-068	C-16-074	MD
Adjacent Facilities/ Roads/Structures	All PRSs and AOCs are associated with or near buildings or areas where buildings have been torn down. Bldg. 27 and V-site are accessible by paved roads.																	
Below Gnd Util:	Underground utility locations will be determined via the LANL excavation permit process. Building 27 and V-site both have underground utility pipes which may have served lavatories or sumps, and which may be contaminated with HE.																	
Above Gnd Elect.	Above-ground electrical lines were noted at Bldg. 16-027 and V-site; lines are expected to be deenergized or removed before work begins.																	
Topography	Bldg. 27 and V-Site are located on a mesa top that is wooded and fairly level.																	
Pathways of Uncontrolled Release/Dispersion	Pathways for uncontrolled release and/or dispersion could occur by air and land (NW).																	
Emergency Access	Emergency access may be obtained by land since the sites are accessible by paved roads.																	
Previous Facilities Operations:																		
HE processing	Activities at V-site and Bldg. 27 were associated with HE processing and research.																	
Electroplating								X			X							
Chem Drum Storage						X									X		X	
Incinerator														X				
Cooling tower			X										X					
Dark Room Ops												X						
Steam-heating distribution pump pit					X													
Pit (used for shake tests)									X									

Table 2-2 Cont'd
Site Description

Potential Release Sites and Areas of Concern Associated with V-Site include: 16-006(g), 16-006(h), 16-013, 16-017, 16-025(x), 16-029(g2), 16-029(h2), 16-029(w), 16-029(x), 16-031(c), C-16-068, and C-16-074
Potential Release Sites and Areas of Concern Associated with GMX-3 include: 16-005(d), 16-017, 16-026(q), 16-031(d), 16-034(p), C-16-065, and Main Drainage (MD)
Potential Release Sites and Areas of Concern Associated with the Administrative Area include: 16-017

Descriptor	16-005(d)	16-026(q)	16-031(d)	16-006(g)	16-006(h)	16-013	16-017	16-025(x)	16-029(g2)	16-029(h2)	16-029(w)	16-029(x)	16-031(c)	16-034(p)	C-16-065	C-16-068	C-16-074	MD
Structure intentionally burned or removed			X							X								
PRS consists of HE sumps, and associated plumbing.		X								X	X	X						
PRS consists of a septic tank and associated plumbing	X			X														
Building foundations and structures							X											
Laboratory																X		
Main S-Site drainage channel																		X

Table 2-3
Previous Substances Used, Disposed, Detected, or Suspected

PRS's and AOC's associated with V-Site include: 16-006(g), 16-006(h), 16-013, 16-017, 16-025(x), 16-029(g2), 16-029(h2), 16-029(w), 16-029(x), 16-031(c), C-16-068, and C-16-074
PRS's, AOC's, and Non-PRS/AOC associated with GMX-3 include: 16-005(d), 16-017, 16-026(q), 16-031(d), 16-034(p), C-16-065, and Main Drainage (MD)
PRS's associated Associated with the Administrative Area include: 16-017

Descriptor	16-005(d)	16-026(q)	16-031(d)	16-006(g)	16-006(h)	16-013	16-017	16-025(x)	16-029(g2)	16-029(h2)	16-029(w)	16-029(x)	16-031(c)	16-034(p)	C-16-065	C-16-068	C-16-074	MD
High Explosives																		
(HE) TNT & RDX	X	X	X	X			X	X	X	X	X	X			X	X	X	X
HE Degradation Products and by-products (boron, TNB, DNB)	X	X	X	X			X	X		X	X	X			X	X	X	X
HE Burn Products			X					X							X			X
Radionuclides																		
Uranium^{238}	X	X		X		X	X					X				X	X	X
Metals																		
Specific metals unknown at this time	X	X	X		X	X	X		X	X				X	X			X
Barium								X			X	X				X	X	
Beryllium				X				X			X	X	X			X	X	
Cadmium								X				X						
Chromium								X				X						
Cyanide				X				X			X	X	X					X
Lead				X				X			X	X	X			X	X	
Nickel								X				X						
Silver				X				X			X	X	X					

Table 2-3 Cont'd

Previous Substances Used, Disposed, Detected, or Suspected

PRS's and AOC's associated with V-Site include: 16-006(g), 16-006(h), 16-013, 16-017, 16-025(x), 16-029(g2), 16-029(h2), 16-029(w), 16-029(x), 16-031(c), C-16-068, and C-16-074
PRS's, AOC's, and Non-PRS/AOC associated with GMX-3 include: 16-005(d), 16-017, 16-026(q), 16-031(d), 16-034(p), C-16-065, and Main Drainage (MD)
PRS's associated Associated with the Administrative Area include: 16-017

Descriptor	16-005(d)	16-026(q)	16-031(d)	16-006(g)	16-006(h)	16-013	16-017	16-025(x)	16-029(g2)	16-029(h2)	16-029(w)	16-029(x)	16-031(c)	16-034(p)	C-16-065	C-16-068	C-16-074	MD
Minerals																		
Asbestos					X													
Organics (VOCs)																		
VOCs		X				X	X	X										X
Varnish & Glue Ops (See Appen-dix B for Chems)				X							X	X						
Organics from septic system	X				X													
Organics (SVOCs)																		
SVOCs				X							X	X						X
Hydraulic Oil																	X	

TABLE 2-4
SCOPE OF WORK

Task	Task Description	Site IDs	Dates
Task 1 Mobilization/ Site Prep.	1.1 **Mobilization:** Equipment and supplies associated with this work will be mobilized to the site, in addition to a backhoe, sanitation facilities, and a mobile trailer. Work zones will be established. 1.2 A drilling rig, backhoe, and/or trackhoe will be mobilized to the site; work zones will be set up in addition to waste storage areas.	All	MARCH 1997 TO AUGUST 1997
Task 2 Excavation	2.1 **Excavation:** A backhoe and/or trackhoe will be utilized to excavated soil in areas where contamination may potentially exist. The ER team will excavate after the D&D team removes structures such as septic tanks, sumps, plumbing, foundations, etc., in addition to excavating undisturbed soil. An excavation permit will be obtained before activities begin. Trenches are not expected to exceed 5 feet in depth and all spoils will be kept a minimum of 2 feet from the edge of the trench. The foundation at PRS 16-034(p) will be removed and disposed of.		
Task 3 Drilling	3.1 **Drilling:** This task involves remote drilling a minimum of two boreholes at the TA-16-100 sump using a hollow-stem auger. Real-time monitoring will be used to assess employee exposure to radiological, physical, and chemical hazards. Dust will be controlled by wetting the cuttings with water by use of a 3 gallon pressure sprayer if necessary. 3.2 Drill-rig maintenance and repair will be done on site and may involve the use of lubricating agents as well as compressed gases for welding.		
Task 4 Site Characterization	4.1 **Backhoe Bucket/Trenches:** Soil samples will be collected from the backhoe bucket or from within excavated trenches (<5' deep) and analyzed onsite for presence of HE, metals, and VOCs using an HE test kits (i.e., LANL's HE spot-test kit, and D-Tech, Ensys kits), XRF portable detector, and PID respectively. Samples will be collected and sent offsite for confirmation. 4.2 **Hand Auger:** A hand auger will be used to collect soil samples which will be screened onsite and sent off as confirmation samples. 4.3 **Drilling:** Soil samples will be screened for radiological, HE, and chemical contamination. Core samples will be prepared and sent to an offsite facility for analysis.		
Task 5 Waste Mgt	5.1All waste will be controlled by the site-specific waste characterization strategy.		
Task 6 Decontamination	6.1 **Personnel and Equipment/Tools:** A golf-cart will be used as an EZ in addition to the established work zones to travel from the EZ to support trailer where personnel and tools will be decontaminated . Commercial soap shall be used decontaminate personnel and an Alconox-water solution shall be used to decontaminate equipment. All equipment and tools must remain in the EZ if radiological contamination is detected until released by a Radiological Control Technician. A pressure washer may be used to decontaminate heavy equipment. 6.2 **Drill Rig/Augers:** The drill rig will be decontaminated in the EZ with an Alconox-water solution. A pressure washer may be used to decontaminate the drill rig.		
Task 7 Incident Response	7.1This task involves response to an incident during work at TA-16. Incidents may include: Rendering first-aid/CPR, making notifications, using a fire extinguisher to fight fires, evacuation. These tasks will be performed as described in Sections 7, 8, and 9 of the HASP and this SSHASP.		

3.0 ORGANIZATION, RESPONSIBILITIES, AND AUTHORITY

Provided in this section are the key personnel having H&S responsibilities and authority in accordance with Section 3 of the HASP. In addition, the lines of communication are identified for key personnel.

TABLE 3-1
KEY PERSONNEL HAVING HS RESPONSIBILITY

TITLE	NAME	ORGANIZATION	PHONE/PAGER
Facility Contacts			
Facility Manager	Dennis Carathers	ESA-FM	667-8439/
Facility Health & Safety	Dan Macdonell	ESA-FM	665-6227/104-6410
Facility HE	Bill McCormick	ESA-FM	667-6316/
Field Project Management			
Field Project Leader	Roy Michelotti	CST-18	665-7444/996-1006
Field Team Manager	Lynn Kidman	ICF Kaiser Engineers	661-5227/699-2126
Waste Management	Lynn Kidman	ICF Kaiser Engineers	661-5227/699-2126
Field Team			
Field Team Leader (FTL)	Linda Fluk	ICF Kaiser Engineers	661-5229/699-1014
Alternate FTL	Peter Gram	ICF Kaiser Engineers	661-5207/699-1697
Site Safety Officer	Ken H. McFadden	MK	662/7300
Drilling Supervisor	Mike Henke	EES-15	665-1115/699-1969
Radiological Screening Personnel	Ken H. McFadden	MK	662/7300
Support Personnel			
Field Unit HS Rep	Ivan Wachler	ESH-5	661-5211/104-6979
ESH-1	Marty Peifer	ESH-1	667-0083/104-6649

4.0 HAZARD ANALYSIS

Provided in this section is the task-specific hazard analyses information and requirements in accordance with Section 4 of the HASP.

Table 4-1
Personnel by Task

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

	Tasks											
Personnel Role	**1.1**	**1.2**	**2.1**	**3.1**	**3.2**	**4.1**	**4.2**	**4.3**	**5.1**	**6.1**	**6.2**	**7.1**
FTL	X	X	X	X	X	X	X	X	X	X	X	X
SSO	X	X	X	X	X	X	X	X	X	X	X	X
RCT			X	X		X	X	X		X	X	X
Sampler						X	X	X				
Driller		X		X	X			X	X		X	
Backhoe Operator			X							X		
Field Support Personnel	X		X			X	X			X		

4.2 HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

Not all chemical products used to accomplish a task or contaminants at a particular site may pose an occupational health threat. The hazardous substances of occupational health concern are identified in this section by task and by class of substance, in accordance with Section 4.1 of the HASP. Results of a health hazard assessment of each chemical product and site contaminant identified in Table 2-2 and associated rationales are provided in Appendix B. Substances that have a hazard assessment resulting in either "possibly could occur", "probably will occur", or likely to occur" and which are expected to result in injury or illness having a hazard severity of "minor", "major", or "catastrophic" are considered to pose an occupational health threat to personnel who may be exposed to these substances, and are included in Table 4-2. The key to the hazard assessment ratings is provided below. The chemical, physical, and toxicological properties for each hazardous chemical substance of occupational health concern are provided in Appendix C. For each class of substances included in Table 4-2, the most hazardous substance is identified in Table 4-3 together with corresponding administrative and engineering controls.

Key to Hazard Assessment Ratings (HAR)

Hazard Severity	**Mishap Probability**			
	Likely to Occur	Probably Will Occur	Possibly Could Occur	Unlikely to Occur
Catastrophic (i.e., death or life-threatening injury/illness from a single encounter)	Imminent	Imminent	Serious	Minor
Major (i.e., significant injury/illness resulting in irreversible harm)	Imminent	Serious	Moderate	Minor
Minor (i.e., injury or illness resulting in reversible harm-not likely to threaten mobility, vision)	Serious	Moderate	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible

Table 4-2
HAZARDOUS SUBSTANCES OF OCCUPATIONAL HEALTH CONCERN

This table also lists those chemicals brought on site for use of ER personnel even though they have a negligible health hazard assessment rating.
N = Negligible; Mi = Minor; Mo = Moderate; S = Serious
Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

HAZARDOUS SUBSTANCE	TASKS											
	1.1	1.2	2.1	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	7.1
Chemicals to be Brought on Site **MSDS for all chemicals brought on site shall be maintained at the TA-16 field trailers.**												
Compressed Gases												
Isobutylene (PID)			N	N		N	N	N				
Acetylene (Welding)					N							
Oxygen (Welding)					N							
Fuels/Lubricants												
Diesel			N	N								
Gasoline			N	N								
Hydraulic Fluid			N	N								
Solvent (WD-40)			N	N								
Oil			N	N								
Site Contaminants of Occupational Health Concern (See Appendix B for Hazard Assessment)												
HE			S	S	S	S	S	S	S	S	S	
Metals			Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	
Uranium^{238}			Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	
Asbestos			N	N	N	N	N	N	N	N	N	
VOC's			N	N	N	N	N	N	N	N	N	
SVOC's			N	N	N	N	N	N	N	N	N	

TABLE 4-3
HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Potential hazards included in this section are those expected to result in one of the hazard assessment ratings defined below and could pose an occupational health threat to workers performing the associated tasks. The hazard assessments and rationales are indicated below with the corresponding administrative and engineering controls for protection from and mitigation of the hazards.
Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
General				
HAZWOPER Work	All	Minor to Serious	The mishap probability associated with HAZWOPER work possibly could occur resulting in a catastrophic injury.	Compliance with OSHA HAZWOPER Standard (29CFR1926.65) for all tasks addressed in this SSHASP. See specific hazards for additional compliance concerns.
Motorized/Mechanized Equipment Operation (Drill Rig/ Backhoe)				
Excavation/Trenching	An excavation permit is required for any soil disturbance at soil depths ≥ 12"; Excavation permit will be obtained in accordance with LANL AR 1-12; contact FU HS Representative to initiate permit process. Excavations shall comply with applicable sections of subpart P of 29 CFR 1926.			
Underground utilities	2.1, 3.1	Minor to Serious	Hazard severity could be catastrophic resulting in irreversible harm or death, and although unlikely to occur, possibly could occur.	The estimated location of utilities (e.g., sewer, telephone, gas, electric, water lines, etc.) shall be determined prior to excavation/trenching or drilling. Notify utility owners of intended work and request they demarcate on the ground surface the location(s) of underground utilities; have a field team member accompany the utility owner rep. to identify the intended excavation location(s) and to determine the specifics of the utility location(s). If the utility owner cannot establish the exact location of utility installation(s), excavation/drilling may proceed with caution, provided detection equipment or other acceptable means to locate utility installation(s) are used. As excavation/drilling operations approach the estimated location of underground utilities, the exact location of the installation shall be determined by safe and acceptable means (i.e., using hand held excavating equipment). While excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard site personnel.
Hoisting and Rigging Equipment	Hoisting and rigging equipment shall be designed, installed, inspected, tested, operated, and maintained by qualified personnel in compliance with applicable sections of 29 CFR 1926.251, Subpart N of 29 CFR 1926, and the DOE Handbook Hoisting and Rigging (DOE-HDBK-1090-95, June 1995).			
Equipment Operation	2.1, 3.1, 3.2	Minor to Moderate	The mishap probability of obtaining an irreversible injury from equipment operation possibly could occur.	Equipment shall be inspected daily or before each daily use. Controls and equipment shall comply with applicable sections of 29 CFR 1926.201
Pinch Points	2.1, 3.1, 3.2, 4.1, 4.2, 6.2	Moderate	The mishap probability of sustaining an irreversible injury from pinch points on heavy equipment possibly could occur.	Guard rotating parts and pinch points in compliance with 29 CFR 1926 Subparts I, J, N, and O as applicable. Personnel shall be instructed to avoid unnecessary contact with those parts of the heavy equipment which pose a pinch point hazard.
Refueling Equipment/Generators	2.1, 3.1	Minor to Moderate	The mishap probability of causing a fire/explosion during refueling possibly could occur resulting in a irreversible injury due to burns/impact from explosion.	Compliance with 29 CFR 1926.152 (d-f).

TABLE 4-3 Cont'd
HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Overhead Elect. Hazards	1.2, 2.1, 3.1	Minor to Serious	The mishap probability of contacting an overhead electrical line possibly could occur resulting in an irreversible injury or death from electric shock or electrocution.	During stationary operation, the drill rig will have a minimum clearance between live lines and any part of the rig of: 10 feet for lines rated 50kV; 10 ft + 0.4 in. for each 1 kV over 50 kV, or twice the length of the line insulator, whichever is greater. In transit with no load and boom lowered, the min. clearance shall be: voltages < 50 kV:.....4 ft min voltages 50 kV < X≤ 345 kV:.....10 ft min voltages 345 kV < X < 750 kV:.....16 ft min
Welding, Cutting, Brazing	A special work permit (SWP) for spark/flame producing operations will be obtained if welding, cutting, or brazing is to occur on site. Administrative and engineering controls will be implemented as per the LANL SWP and HASP Section 4.2.2.12			
Fire/explosion/burn hazards	3.2	Minor to Serious	The mishap probability of sustaining a burn or injury from explosion due to welding, cutting, or brazing possibly could occur but if occurred may result in an irreversible injury.	Compliance with SWP and Subpart J of 29 CFR 1926. Personnel conducting this activity shall be protected in compliance with Subpart I of 29 CFR 1910 and this SSHASP.
Working at Heights				
Falls	2.1, 3.1	Moderate	The mishap probability of sustaining an injury from a fall possibly could occur resulting in a significant injury.	Fall protection is not expected to be needed since work from heights of 6 ft or greater is not expected. If work is to be conducted on the drill rig mast, it will be lowered and not ascended while in the upright position. All trenches are expected to be less than 5 ft in depth.
Hand and Power Tools				
Operation and Maintenance	All	Minor to Serious	The mishap probability of sustaining an irreversible injury possibly could occur from hand or power tools.	All tools will be inspected before use by the SSO and taken out of commission if damaged or deemed unsafe; compliance with 29 CFR 1926.300-302.
Miscellaneous				
Sanitation/Housekeeping	All	Minor-Serious	The mishap probability of sustaining an irreversible injury, such as a puncture, cut, electrical shock, etc. due to unsanitary working conditions or cluttered/disorderly work site could possibly occur.	Compliance with 29 CFR 1926.25, 51, and 250(c). The SSO shall conduct daily site inspections and ensure good housekeeping practices are followed. Sanitary potable water and toilet facilities shall be available to all personnel on site. Personnel will wash face and hands (as necessary) prior to eating, drinking, smoking, chewing gum or tobacco (these activities shall not allowed in established work zones).
Uneven Terrain, Slips, Trips, Falls	All	Minor	This mishap probability of sustaining a minor injury such as a strain or sprain possibly could occur due to variable environmental conditions.	Personnel will be informed to be cautious during work in areas where slipping, tripping, or falling may occur. Slick surfaces and tripping hazards shall be mitigated as much as possible. Personnel shall practice "good housekeeping" to reduce the risk of a trip or fall.
Physical Hazards				
Lightning Strikes	All	Minor-Serious	The mishap probability of sustaining an injury from a lightning strike possibly could occur resulting in an irreversible injury or death.	Personnel will be briefed on the dangers of lightning strikes in accordance with the ER Project HASP (Table 1 of HASP).

TABLE 4-3 Cont'd
HAZARD ASSESSMENT AND ADMINISTRATIVE AND ENGINEERING CONTROLS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazard	Task(s)	Hazard Assessment	Hazard Assessment Rationale	Administrative & Engineering Controls (Prevention/Mitigation Measures)
Thermal Stress	All	Minor- Serious	The mishap probability of contracting heat or cold stress possibly could occur resulting in a life-threatening injury.	Personnel will be informed of the signs and symptoms of heat/cold stress (Table 1 of HASP). Personnel will be monitored for thermal stress and an attempt to reduce the probability of injury by implementing an appropriate work regime, including work breaks and shelter from the elements. The thermal stress program contained in section 11 of the ER/Decommissioning Health and Safety Activities Manual will be implemented.
Excessive Noise	2.1, 3.1	Minor- Moderate	The probability of sustaining a hearing significant injury due to excessive noise possibly could occur.	Whenever voices must be raised to communicate between two or more persons located $\leq$3 feet of each other, noise levels likely to be greater than the PEL; conduct noise monitoring per Section 6 of this SSHASP; compliance with Section 4.2.2.7 of the HASP and 29 CFR 1910.95.
Steam Cleaner Operations	6.1, 6.2	Minor -Moderate	The probability of sustaining a burn or laceration from the steam cleaner possibly could occur resulting in a significant injury.	Individuals conducting steam-cleaner operations shall be briefed on the proper use and hazards associated with using a steam cleaner. Personnel shall use caution and not operate the cleaner when other personnel are in the direct vicinity.
RADIOLOGICAL				
Uranium^{238}	2.1, 3.1, 4.1,4.2, 4.3, 6.1, 6.2	Minor	The mishap probability of sustaining an exposure to U^{238} possibly could occur resulting in a minor exposure.	Personnel shall practice ALARA by minimizing exposure and maximizing distance from identified sources or radiological contaminants. Radiological monitoring shall be conducted per Section 6 of this SSHASP.
CHEMICAL HEALTH HAZARDS				
HE (RDX, TNT), HE Degradation Products (Boron, DNB, TNB) and HE Burn Products	2.1, 3.1, 3.2, 4.1, 4.2, 4.3, 5.1, 6.1, 6.2	Minor- Serious	The mishap probability of encountering HE and causing a detonation during excavation/drilling activities possibly could occur resulting in a life-threatening injury from the impact of explosion.	All personnel shall be trained in HE awareness. An HE spot test shall be conducted on excavated soil. If HE is detected, personnel shall use caution and notify Bill McCormick (ESA) for safety instructions. If so instructed, soil shall be wetted to reduce the probability of explosion. Personnel shall not approach the backhoe during excavation activities. Drilling shall be conducted remotely. All personnel in the EZ shall stand behind a blast shield during drilling operations.
Metals (See Appendix B for Specific Metals)	2.1, 3.1, 3.2, 4.1, 4.2, 4.3, 5.1, 6.1, 6.2	Minor	The probability of a mishap resulting in metals exposure possibly occur resulting in a minor injury.	Dust suppression techniques shall be practiced to hinder metal contaminants from becoming airborne. Metal concentrations are not known, therefore, personal samples shall be taken to verify whether or not overexposure to the PEL of listed metals (Appendix B) is probable. Personnel shall work upwind of excavation areas.

5.0 SITE CONTROLS

In accordance with Section 5 of the HASP, the required site control measures are specified below for each task or group of tasks having different requirements. Any exceptions or deviations from requirements of the HASP are noted below. Site map(s) are provided in Appendix A to show where the following site control measures will be located. Since come zone or facility locations may change as site work progresses due to daily variability in site conditions and/or operations (e.g., wind or access), actual locations are to be explained to field team members by the SSO, or the FTL during daily HS tailgate meetings and documented in the logbook kept by the ER SSO.

TABLE 5-1
SITE CONTROL MEASURES

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Control Measures	1.1	1.2	2.1	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	7.1	Additional Information
Exclusion Zone (EZ)													
Not Applicable	X	X											The exclusion zone(s) shall be demarcated with barrier tape, rope, or fence and shall be posted in accordance with Subpart G of 29 CFR 1926. There will be no eating, drinking, smoking, chewing, application of cosmetics, or lip balm while in the EZ. A golf cart will be used to transport personnel from the site EZ to the CRZ located in a support trailer. The golf cart will be demarcated with barrier tape and posted as an EZ.
Regulated Area			X	X	X	X	X	X	X	X	X	X	
Contamination Reduction Zone (CRZ)													
Not Applicable	X	X											The CRZ will be demarcated by barrier tape, rope, or fence and posted in accordance with Subpart G of 29 CFR 1926. The CRZ will be located in a support trailer located on site.
Centralized Location			X	X	X	X	X	X	X	X	X	X	
Support Zone (SZ)													
Not Applicable	X	X											Demarcation of the SZ with rope or barrier tape is unnecessary but it will be posted in accordance with Subpart G of 29 CFR 1926.
Localized at Work Site			X	X	X	X	X	X	X	X	X	X	
Equipment Staging Area													
Not Applicable	X	X											Demarcation of the equipment staging area is uncessary but it will be posted in accordance with Subpart G of 29 CFR 1926.
Located in SZ			X	X	X	X	X	X	X	X	X	X	

TABLE 5-1 Cont'd
SITE CONTROL MEASURES

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Control Measures	1.1	1.2	2.1	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	7.1	Additional Information
Equipment Decon Pad/Facility													
Not Applicable	X	X	X	X	X	X	X	X	X			X	Demarcation of the decontamination area of heavy equipment is unnecessary but will be posted in accordance with Subpart G of 29 CFR 1926.
Located in EZ										X	X		
Temporary Waste Storage Area													
Not Applicable	X	X			X	X	X	X		X	X	X	The temporary waste storage area shall be posted in accordance with Subpart G of 29 CFR 1926.
TBD by Facility Personnel			X	X					X				
Support Trailer(s)/Vehicles													
Support trailers shall be located between Bldg. 16-027 and V-site.													
Hand Wash Facility													
Not Applicable	X	X											The hand wash facility shall be posted per 29CFR 1926.65(n) and Subpart G of 29 CFR 1926.
Located in SZ			X	X	X	X	X	X	X	X	X	X	
Toilet Facility													
A portable toilet facility shall be located on site.													
Clothing Change Facility													
Not Applicable	X	X										X	The clothing change facility shall be located in the support trailer(s); Compliance with 29 CFR 1926.65(k) & 1910.141(e). Postings per Subpart G of 29 CFR 1926.
In Support Trailers			X	X	X	X	X	X	X	X	X		
Wind-Direction Indicator													
Not Applicable	X	X										X	The wind-indicator shall be located as to be visible to all field-team members. Personnel shall observe wind direction and attempt to work upwind of operations.
Flag, ribbon, or survey tape in EZ and SZ			X	X	X	X	X	X	X	X	X		

6.0 EXPOSURE MONITORING AND CORRESPONDING ACTIONS

In accordance with Section 6 of the HASP, personnel exposure monitoring requirements, action levels, and the corresponding actions to be taken are specified in the tables in this section. Table 6-1 specifies the requirements for exposure monitoring using direct-reading instruments and Table 6-2 specifies the personal dosimetry requirements.

TABLE 6-1
DIRECT-READING INSTRUMENT REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazardous Cond./Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
Health Physics							
Radiation Gross α and gross Beta/Gamma cont.	2.1, 3.1, 4.1, 4.2, 4.3	Beta/Gamma - Eberline ESP-1 with HP-260 probe or equiv.	Per LANL RadCon Manual and training	Intrusive activities: Ground surface prior to disturbance and excavated soil/material	Background	Field-team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Intermittent ESH-1 coverage Large area swipes for α (2000 cm^2) counted using field alpha screening instrument; direct frisk for Beta/Gamma	Standard levels set by ESH-1
		α -Ludlum 139 with air proportional probe or equiv.		Non-Intrusive Activities: Ground surface near source (as applicable based on potential for soil contamination)	> Background α < 500 cpm/ probe area Beta/Gamma < 5,000 cpm/probe area	Notify ESH-1 of elevated readings. Dedicated field-team member trained in ESH-1 procedures performs surveys (soil, core, personnel, etc.) Increased intermittent ESH-1 coverage. swipes counted using Ludlum 2000 tray counter or equiv.; direct frisk for Beta/Gamma.	
				Personnel: Prior to exiting EZ, CRZ Equipment: Prior to decon and for release	α > 500 cpm/probe area Beta/Gamma > 5,000 cpm/probe area	Work may only proceed according to approved RWP and with full-time onsite ESH-1 technician (or equiv.) In accordance with Sections 3.2.4 and 3.3.4 of the HASP	
Industrial Hygiene							
Respirable Particulate Not Otherwise Classified (from dust generation)	2.1, 3.1	Mini-ram	ER Project HS Activities Manual	Periodically near point of dust generation and in employees' breathing zones.	2.5 mg/m^3	≥ action level (AL) in employee breathing zone: implement dust suppression methods to control particulate to below AL. If unable to lower particulate levels below AL, conduct personal sampling and demarcate zones of particulate exposure and limit access only to employees having sufficient PPE, training, and medical surveillance per this SSHASP.	This AL is generally considered that level when dust is visible. This AL should allow sufficient time to respond to elevated airborne particulates

TABLE 6-1 Cont'd
DIRECT-READING INSTRUMENT REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazardous Cond./Substance	Task(s)	Instrument	Procedure	Location and Frequency of Monitoring	Action Level(s)	Response Action(s)	Action Level Rationale
Organic Vapors: Possible OV's associated with varnish/glue act.: Ethyl Benzene, Toluene, Phenol, Trimethyl Benzene, Thiophene, Xylene Pyridine	2.1, 3.1, 4.1, 4.2, 4.3	PID-HNu with 11.7 eV probe	ER Project HS Activities Manual	Periodically near points of excavation/trenching & drilling; periodically in employees' breathing zones; periodically near soils/core samples to be sampled.	2.5 ppm in breathing zone	If ≥ AL, remove employees from immediate area and allow to ventilate naturally or implement mechanical means. If vapors persist above ALS, use colorimentric tubes in attempt to identify vapors, limit access to EZ, and notify FU HS Rep.	½ PEL for phenol and pyridine
Physical Stressors							
Heat Stress	All	Ambient Temperature Monitor	Section 11.7 of ER/Decommissioning H&S Activities Manual	Employees' heart rates shall be monitored based on ambient air temperature(T): Frequency for breathable clothing: T ≥ 80⁰ F every120 min T ≥ 85⁰ F every 90 min T ≥ 90⁰ F every 60 min Frequency for non-breathable clothing: T ≥ 70⁰ F every 90 min T ≥ 80⁰ F every 60 min T ≥ 85⁰ F every 30 min T ≥ 90⁰ F every 15 min	Initial heart rate > 110 beats/min and rest heart rate > 80 beats/min.	If heart rates are > AL reduce work cycle by 1/3; implement work/rest regime, doff excessive PPE, provide shaded rest area, and replace lost body fluids.	In accordance with Section 11.7 of ER/Decommissioning H&S Activities Manual
Noise	2.1, 3.1	Noise level meter	ER HS Activities Manual	Only non-LANL employees will be monitored; contact FU HS Rep if LANL employees need monitoring. Noise measurements required when voices must be raised to commu. between two persons located ≤ 3 ft of each other; monitor hearing zones of employees affected by excessive noise. Noise levels will be monit. on the 1st day of occurrence and when operations or environmental conditions change. SLM: 1st day of occurrence and every 30 minutes during periods of excessive noise.	85 dBA (Non-LANL employees) 84 dBA (Hearing protection required-LANL employees only) 80 dBA (Hearing conservation program-LANL employees only)	≥ AL: demarcate zones of excessive noise and limit access only to employees having sufficient hearing protection training, medical surveillance, and hearing protection as per this SSHASP. The appropriate NRR for hearing protection shall be determined after initial monitoring is conducted to ensure compliance.	29 CFR 1910.95 for non-LANL employees LANL AR 8-2 for LANL employees
Cold Stress	All		Section 11.8 of ER/Decommissioning H&S Activities Man.	Periodically monitor temperature and wind conditions before and during work.	Per Section 11.8 of ER/Decommissioning H&S Activities Manual		

6.2 PERSONAL DOSIMETRY

Requirements for personal dosimetry and the corresponding action levels and response actions are specified in Table 6-2 for each task or group of tasks having different requirements, action levels or responses. These requirements, levels, and actions are set in accordance with Section 6 of the HASP and with the chemical-specific standards listed in Table 2 of the HASP. Any exceptions or deviations from requirements of the HASP are noted where applicable.

TABLE 6-2
PERSONAL DOSIMETRY REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazardous Substance/ Condition	Task(s)	Action Levels	Dosimetry Requirement	Action Level(s) Rationale
Health Physics				
External Sources of Radiation Exposure	All	Potential to exceed 100 mREM/year dose limit	Monthly TLD Badge	10 CFR 835
Internal Sources of Radiation Exposure	All	Potential to exceed 100 mREM/year dose limit	Urinalysis-In vitro bioassays may be required if conditions warrant and shall be specified by ESH-1/ESH-12 in the RWP In vivo-Baseline and termination	10 CFR 835

TABLE 6-2 Cont'd
PERSONAL DOSIMETRY REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazardous Condition	Tasks	Instruments/ Supplies	Location and Duration of Monitoring	Sampling/Analytical Method	Action Levels/ Rationale	Response Actions
Metals: Barium Beryllium Cadmium Chromium Cyanide Lead Nickel Silver	2.1, 3.1	Personal air-sampling pumps (see requirements in NIOSH Methods 7300)	At least one personal sample shall be taken (at task startup) for both tasks 2.1 and 3.1 in PRSs suspected of metals contamination (at the discretion of the SSO) since metals levels are unknown. Suspect metals are based on historical knowledge of the sites.	NIOSH Methods 7300 (Cr, Cd, Pb, Ag, Ni); if these metals are shown to be above the ALS, additional sampling for Ba, Be, and CN shall be instituted using NIOSH methods 7056, 7102, and 7904 respectively.	Ag 0.05 mg/m^3 Ba 0.25 mg/m^3 Be 0.25 $\mu g/m^3$ Cd 2.5 $\mu g/m^3$ Cn 2.5 mg/m^3* Cr 0.25 mg/m^3 Ni 0.5 mg/m^3 Pb 30$\mu g/m^3$ All action levels are based on an 8-hr time weighted average ½ PEL or TLV for specific metals; compliance with 29 CFR 1926.65(h), .62, .1027. * AL derived from ½ PEL for Potassium cyanide as Cn.	If ≥ AL implement standard-specific requirements such as additional personal monitoring and medical surveillance. Implement dust suppression methods and restrict access to affected zones to those personal with adequate PPE, training, monitoring, and medical surveillance. If respiratory protection is determined to be needed for any operation due to excessive metals levels, this SSHASP may be modified to dictate requirements.

7.0 PERSONAL PROTECTIVE EQUIPMENT

In accordance with Section 7 of the HASP, PPE requirements are specified below for each task or group of tasks having different requirements. Only personnel who are trained and qualified to use the equipment in accordance with Section 7 of the HASP and Section 10 of the HASP and SSHASP are allowed to use the equipment specified. Any exceptions or deviations from requirements of these sections are noted below.

TABLE 7-1
PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

PPE Requirements	1.1	1.2	2.1	3.1	3.2	4.1	4.2	4.3	5.1	6.1	6.2	7.1
Head	Hard hats are required where overhead hazards exist (29 CFR 1910.135, ANSI Z89.1-1986)											
Eyes	Safety glasses with side shields are required for all tasks (29 CFR 1910.133, ANSI Z87.1-1989); Goggles required during refueling activities.											
Face	Face shields are required during pressure washing activities. Welding helmet (No. 12 lens shade) is required during welding activities.											
Body (Cotton Coveralls)			X	X	X*	X	X	X		X		
Body (Poly Coated Tyvek or Full Body Rain Suit)	Shall be required during pressure washing activities.											
Hands (Inner Gloves) Nitrile			X	X	X*	X	X	X		X	X	
Hands (Outer Gloves) Nitrile (≥ 12" length & 0.01 " thick)			X	X	X*	X	X	X		X	X	
Hands (Outer Gloves) Nitrile, Cotton, or Leather Work Gloves	Personnel in the EZ/CRZ not contacting contamination may wear 2 pairs of the innner nitrile gloves or a pair of cotton or leather work gloves over the inner pair of nitrile gloves.											
Feet Steel-toed shoes (29 CFR 1910.136, ANSI Z41-1991	Shall be required at all times. TA-16 personnel have allowed the ER team to put on their Steel-toed shoes at the field trailer. This helps prevent the spread of contamination.											
Feet Chemical resistant boots or boot covers over Steel-toed shoes			X	X	X*	X	X	X		X	X	
Ears	Hearing protection, ear plugs or muffs, shall be worn in areas of excessive noise as determined by noise monitoring. A minimum NRR rating of 30 is required for plugs and muffs until monitoring data warrants otherwise.											
Fall Protection	Shall be required if work is to be performed within 5 feet of an unprotected fall hazard that is ≥ 6 feet in depth.											

* This PPE requirement assumes the Drill rig is being repaired inside an EZ.

PPE requirements shall be reviewed by the SSO as site conditions change, and if PPE needs to be modified, a modification to this SSHASP shall be made.

8.0 DECONTAMINATION

In accordance with Section 8 of the HASP, personnel and/or equipment decontamination requirements are specified below. Any exceptions or deviations from Section 8 of the HASP are noted below.

TABLE 8-1 PERSONNEL AND EQUIPMENT DECONTAMINATION REQUIREMENTS
Personnel and Monitoring Equipment
Standard Approach, Level D decontamination shall be instituted. Commercial soap and aqueous rinse shall be used to remove contamination from PPE. A golf cart shall be used to transport potentially contaminated personnel from the EZ to the CRZ located in a support trailer. All personnel shall be required to wash face and hands before leaving the support zone. No eating, drinking, chewing, or application of cosmetics shall be allowed in the EZ or CRZ.
Sampling, Heavy Equipment, and Drill Rig
Hand-held tools and equipment shall be deconned in the EZ using an Alconox/water solution and rinsed in tap water. Heavy equipment and drill rig shall be decontaminated using scrub brushes and pressure washer. An HE release form shall be issued, by TA-16 personnel, for all potentially contaminated equipment prior to removing it from the HE corridor.

9.0 EMERGENCY/INCIDENT ACTION PLAN

Incident/emergency action requirements, equipment, and supplies are specified below for each task or group of tasks having different requirements. Response to an incident or emergency shall occur according to Section 9 of the HASP and this section. Any exceptions or deviations form requirements of the HASP are noted below.

In the event of an incident or emergency, the FTL will function as the site emergency/incident coordinator, as necessary, and will arrange for immediate notification of LANL emergency response personnel to take control of the scene and /or arrange for immediate notification of appropriate authorities. Other key onsite incident/emergency response personnel are identified below. Only personnel who are trained and certified in accordance with Sections 7, 9, and 10 of the HASP and SSHASP are allowed to respond and use the equipment specified. Incident/emergency contacts and telephone numbers and a map indicating the route to the nearest hospital and medical clinic from each investigation site are included in Appendix D. Both these items shall be posted on site where readily accessible to field-team personnel. Site-specific muster areas shall be determined by the SSO prior to the start of field operations each day and shall be communicated to individuals on site during the HS Tailgate meeting and as other individuals arrive at the site. Location(s) of muster areas may vary from day-to-day depending upon variable site operations and conditions, and shall be documented daily by the SSO or FTL.

In the event of an incident requiring ER personnel to evacuate the general technical area of TA-16, facility personnel can notify ER personnel via cellular telephones. In the event of an emergency or incident involving ER personnel, proper notifications to personnel identified in Appendix D of this SSHASP shall be made. If a radiological incident occurs, proper notifications and reporting shall be conducted in accordance with LP107-01.0, "Notification and Reporting of Radiological Incidents." In the unlikely event that an unknown material is discovered during these activities, all workers will exit the EZ and proper notifications to personnel identified in Appendix D of this SSHASP shall be made.

TABLE 9-1 EMERGENCY/INCIDENT ACTION REQUIREMENTS	
First Aid Provider(s): Linda Fluk, Ken H. McFadden CPR Provider(s): Linda Fluk, Ken H. McFadden	
Communications	
Cellular Phones	Cellular phones shall be available during all tasks for communications.
Air Horn(s) or Vehicle Horn	An air horn or vehicle horn shall be readily accessible on site for all tasks except mobilization. One long blast means that personnel are to evacuate the work area and proceed to the designated muster area.
Incident Response Equipment	
Eyewash Station	A portable emergency eyewash shall be located within 10 sec travel time and not more than 100 feet of travel distance of any source of chemical splash that may be corrosive or moderately to severely irritating to body tissue. They must have a capacity to be able to provide continuous, hands-free, flushing for 15 minutes. The eyewash shall be inspected and the solution changed in accordance with the manufacturer's directions.
Industrial First-Aid Kit and Bio. Pathogen and Waste Disposal Kit	The first-aid and bio. pathogens kits shall be available for all tasks and supplies shall be checked and resupplied as needed on a weekly basis. First-aid kit and bio. pathogens kits shall comply with 29 CFR 1926.50(d) and 1910.1030© respectively.
Fire Extinguisher	A 10 lb ABC fire extinguisher shall be available for all tasks. An additional fire extinguisher shall be located on heavy equipment.

10.0 TRAINING

Training requirements are specified below by job title for each task or group of tasks having different requirements. Personnel shall be trained in accordance with Section 10 of the HASP and as specified below. Any exceptions or deviations from requirements of the HASP are noted below. Personnel performing the roles indicated below shall have completed and have current documentation of the training specified. The SSO or FTL shall verify that personnel have met the training requirements prior to authorizing individuals to enter controlled zones of the work site.

TABLE 10-1
TRAINING REQUIREMENTS

FPL = Field Project Leader; FTM = Field Team Manager; FTL = Field Team Leader; SSO = Site Safety Officer; RSP = Radiological Screening Personnel; SAMP = Sampler; RCT = Radiological Control Technician; DRIL = Driller; BCKH = Backhoe Operator; SUP = Field Support Personnel
R = Read Training; C = Classroom Training; F = Field Training; AN = As Needed per the HASP or Regulatory Requirement; ER = Employer Required

Training Requirement	FPL	FTM	FTL	SSO	RSP	SAMP	RCT	DRIL	BCKH	SUP
HASP	R	R	R	R	R	R	R	R	R	R
SSHASP	R	R	R	R	R	R	R	R	R	R
Pre-Job Start HS Briefing (per Section 10.1 of HASP)	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C	F or C
Daily HS Tailgate Meetings	F	F	F	F	F	F	F	F	F	F
Conduct of Operations and Occurrence Reporting	R	R	R	R	R	R	R	R	R	R
Employee Commitment to Safety	ER	ER	ER	ER	ER	ER	ER	ER	ER	ER
OSHA Rights and Responsibilities	R	R	R	R	R	R	R	R	R	R
Health Physics Checklist Indoctrination	C	C	C	C	C	C	C	C	C	C
Rad. Worker II	C	C	C	C	C	C	C	C	C	C
40 Hr. HAZWOPER	C	C	C	C	C	C	C	C	C	C
24 Hr. HAZWOPER Supervised Field Work	AN	AN	F	F	F	F	F	F	F	F
8 Hr. HAZWOPER Annual Refresher	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN
8 Hr. HAZWOPER Supervisor	AN	AN	C	AN	AN	AN	AN	AN	AN	AN
SSO (per Section 10.1.1.5 of HASP)				F/C						
Employer's Haz Com Program	AN	AN	ER	ER	ER	ER	ER	ER	ER	ER
Fire Extinguisher Use			C	C	C	C		C	C	C
PPE (per Section 7.1 of HASP)			F/C	F/C	F/C	F/C	F/C	F/C	F/C	F/C
Hearing Conservation (Section 4.2.2.7 of HASP)	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN
Sanitation (29 CFR 1926.51)		R	R	R						

TABLE 10-1 Cont'd
TRAINING REQUIREMENTS

FPL = Field Project Leader; FTM = Field Team Manager; FTL = Field Team Leader; SSO = Site Safety Officer; RSP = Radiological Screening Personnel; SAMP = Sampler; RCT = Radiological Control Technician; DRIL = Driller; BCKH = Backhoe Operator; SUP = Field Support Personnel R = Read Training; C = Classroom Training; F = Field Training; AN = As Needed per the HASP or Regulatory Requirement; ER = Employer Required

Training Requirement	FPL	FTM	FTL	SSO	RSP	SAMP	RCT	DRIL	BCKH	SUP
1st Aid (Am. Red Cross or Equiv.)	First-aid and CPR training is required only for those individuals designated as 1st-aid and CPR providers respectively in Table 9-1									
CPR (Am. Red Cross or Equiv.)										
Bloodborne Pathogens (29 CFR 1910.1030)	Required only for the 1st aid and CPR designated individuals listed in Table 9-1 only.									
Materials Handling, Storage, Use, Disposal (29 CFR 1926.250, 252)				R						
Signs, Signals, Barricades (29 CFR 1926.200)				R						
Tools-Hand and Power (29 CFR 1926.302)				R						
Electrical Safety Awareness (Subpart K of 29 CFR 1926)				R				R		
Motor Vehicles, Mechanized Equipment				R				R	R	
Crane/Rigging Safety [29 CFR 1926.251, 406, 550(a)]				R				R		
Welding and Cutting [29 CFR 1926.350(d), 351(d), 354(a)]				R				R		
HE Awareness Training	C	C	C	C	C	C	C	C	C	C
TA-16 Site-Specific Training	C	C	C	C	C	C	C	C	C	C
Excavation/Trenching Competent Person [29 CFR 1926.651(k), 32(f)]									C (one or the other)	

11.0 MEDICAL SURVEILLANCE

The medical surveillance requirements of this section have been established in accordance with Section 11 of the HASP unless otherwise noted below.

TABLE 11-1
MEDICAL SURVEILLANCE REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Hazard	Task(s)	Action Level	Requirement
Hazardous Waste Operations	All	Potential for exposure to hazardous substances or health hazards ≥ PELs or published exposure limits during HAZWOPER work	29 CFR 1926.65(f)
Cadmium, Lead	2.1, 3.1, 4.1, 4.3	≥ OSHA Action Levels	29 CFR 1926.62, 1910.1027
Bloodborne Pathogens	7.1	Any occupational exposure	29 CFR 1910.1030(f)
Hearing Protection	All	≥ 85 dBA for non LANL workers, ≥ 84 dBA for LANL workers (See Table 6-1)	29 CFR 1910.95(g)

12.0 QUALITY CONTROL AND QUALITY ASSURANCE (QC/QA)

Provided in this section are requirements for QC/QA in accordance with Section 12 of the HASP. The FTL shall ensure that the inspections are conducted and documented and that appropriate actions are taken and documented to rectify identified deficiencies, if any.

TABLE 12-1
INSPECTION REQUIREMENTS

Tasks: 1.1 Mobilization; 1.2 Drill Rig Mobilization; 2.1 Excavation; 3.1 Drilling; 3.2 Drill-Rig Repair; 4.1 Soil Sampling-Backhoe/Trenches; 4.2 Soil Sampling-Hand Auger; 4.3 Soil Sampling-Drilling; 5.1 Waste Mgmt; 6.1 Personnel/Equip Decon; 6.2 Drill Rig Decon; 7.1 Incident Response

Inspection	Inspector	Tasks
Job Site Material and Equipment [in accordance with 29 CFR 1926.20(b)(2)]	SSO	ALL
General Sanitation (i.e., potable and non-potable water, toilets, washing facilities, eating and drinking areas, vermin control, and/or change rooms; in accordance with 29 CFR 1926.51)	SSO	ALL
Materials handling, storage, use and disposal (in accordance with 29 CFR 1926.250, 252)	SSO	ALL
Signs, Signals, and Barricades (in accordance with 29 CFR 1926.200)	SSO	ALL
PPE (Section 7 and 29 CFR 1926.95)	User	ALL
Incident/emergency response equipment (prior to each use and at least monthly)	SSO	7.1
Electrical Equipment [per 29 CFR 1926.403(b), 416(f)(8)]	SSO	ALL
Tools-Hand and Power (in accordance with Subpart I of 29 CFR 1926)	SSO	ALL
Excavation and Trenches (in accordance with Subpart P of 29 CFR 1926)	CP	2.1, 3.1
Motor Vehicle and Mechanical Equipment (in accordance with Subpart O of 29 CFR 1926)	CP	ALL
Fire Extinguishers [29 CFR 1926.150(a)(c)	SSO	7.1
Derricks (drill rig) and Cranes [in accordance with 29 CFR 1926.550(a)(5),(6) and 406(a)]	CP	3.1
Welding and cutting equipment (in accordance with Subpart J of 29 CFR 1926)	CP	3.2

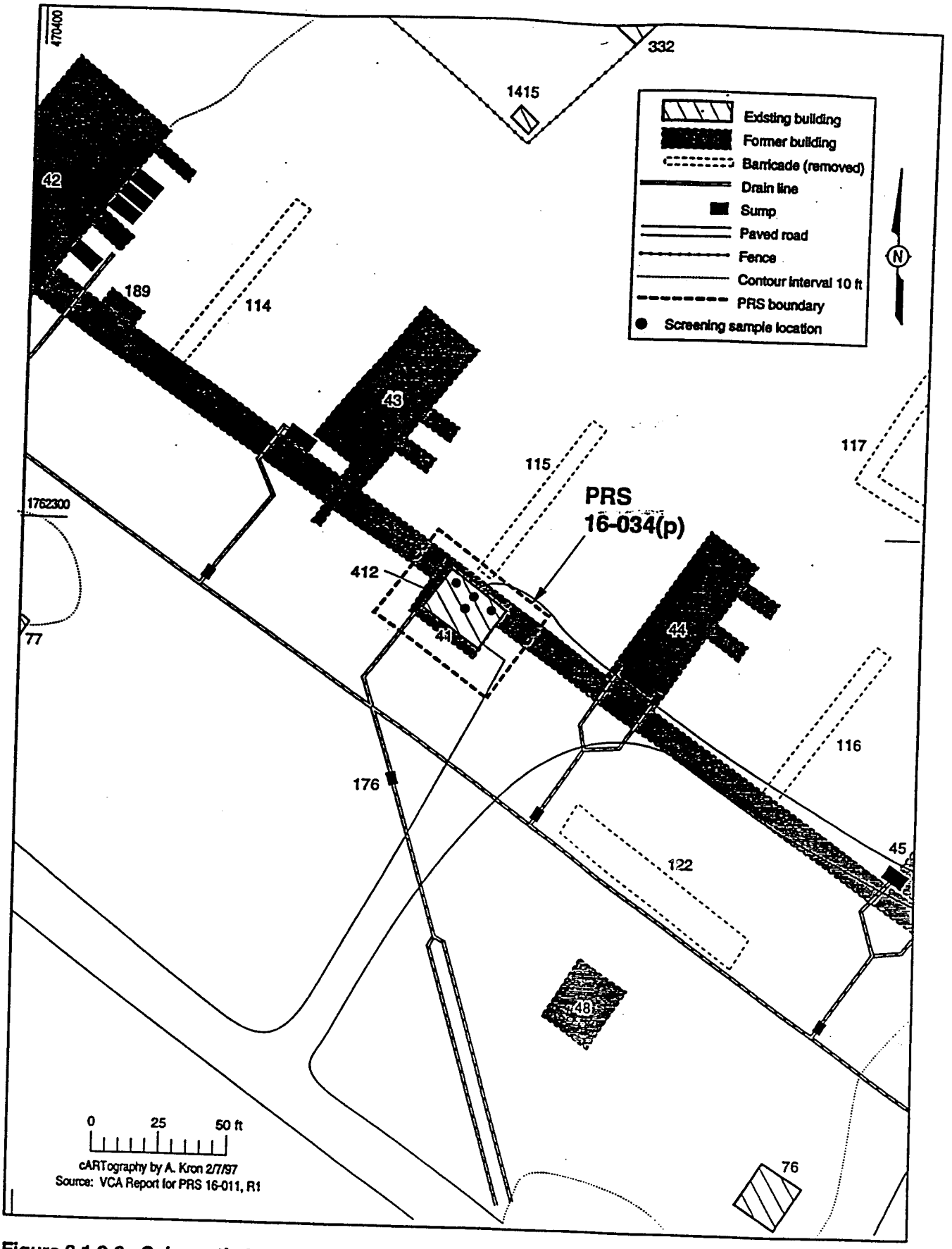


Figure 3.1.2-3. Schematic laboratory sample locations at PRS 16-034(p).

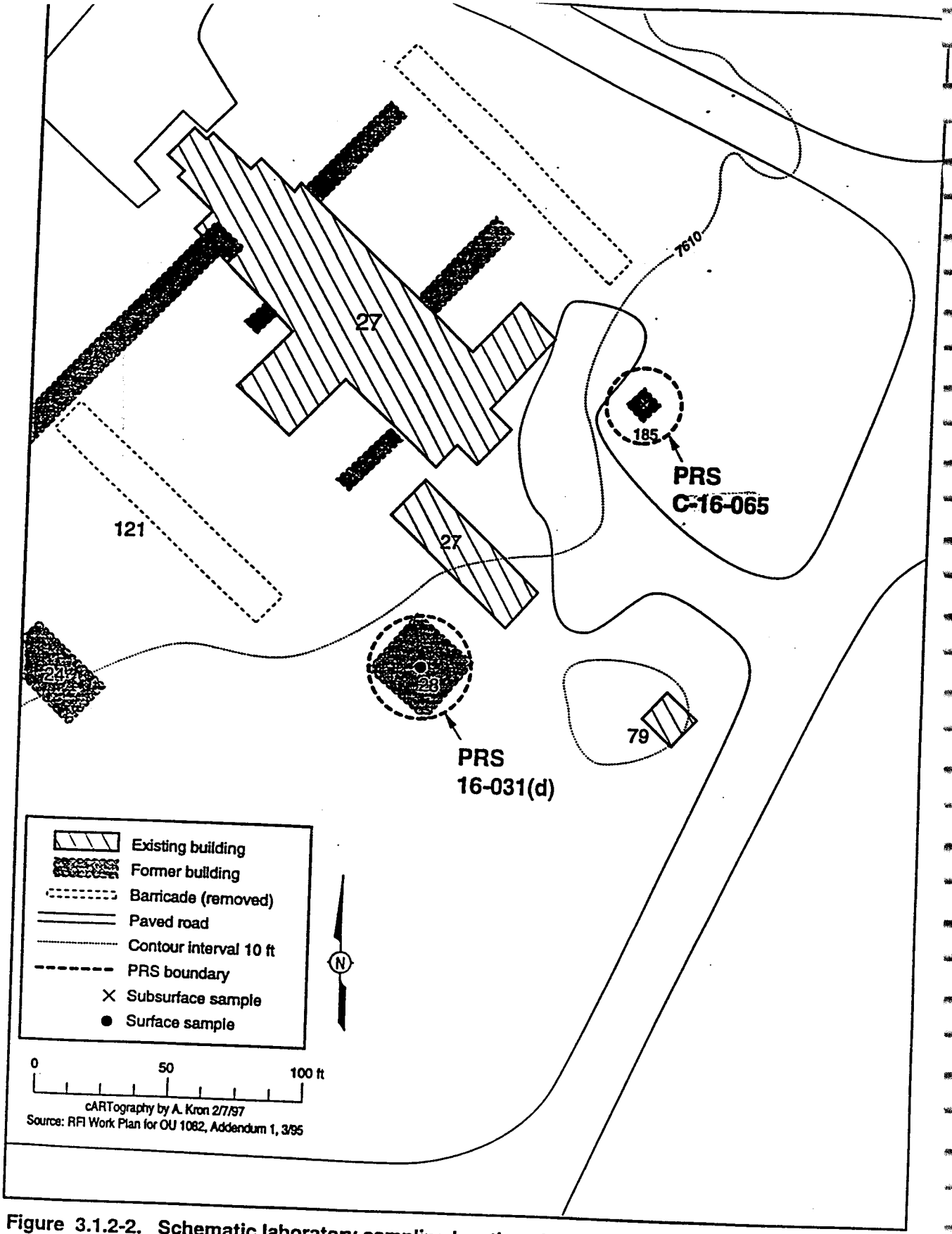
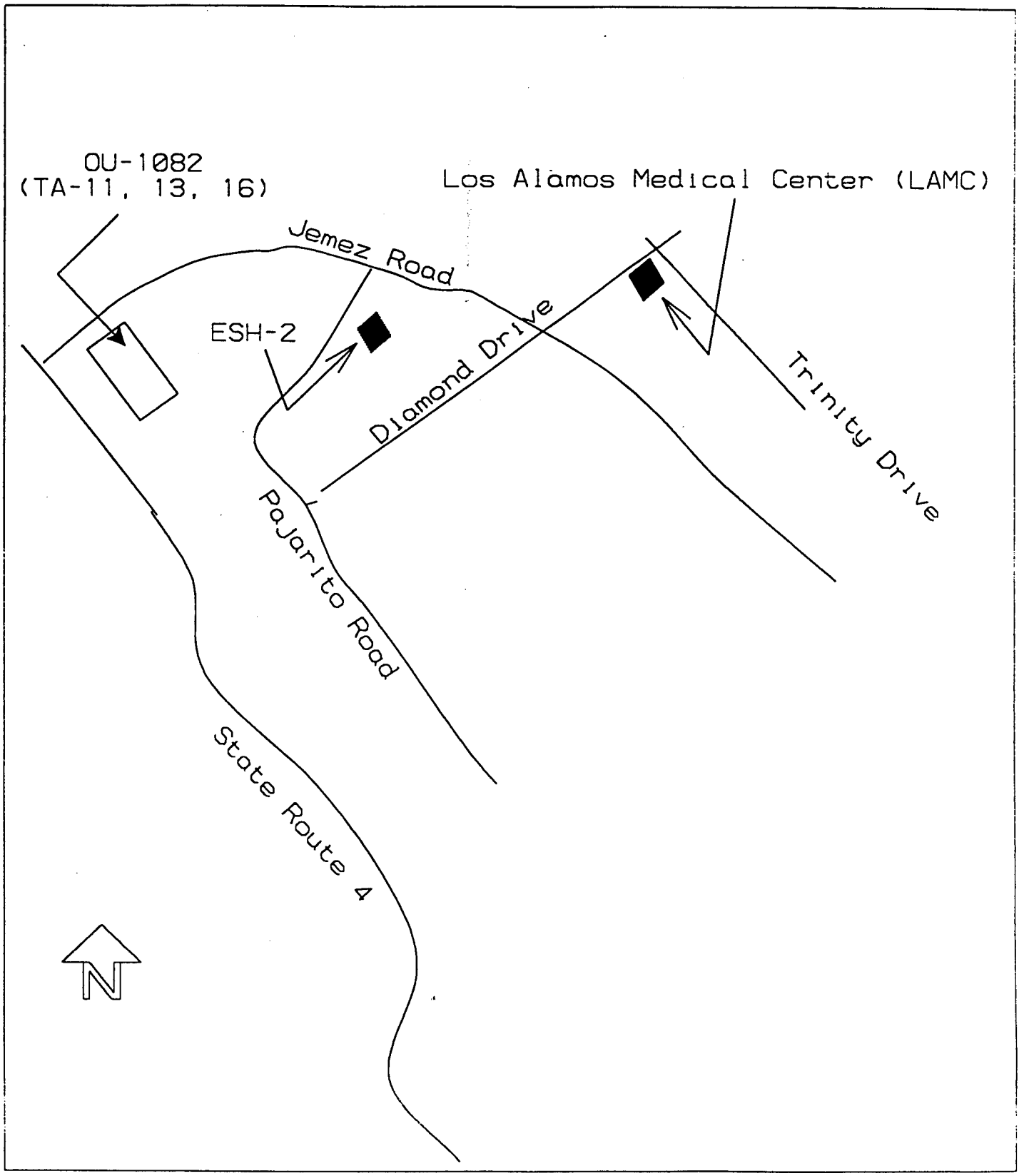


Figure 3.1.2-2. Schematic laboratory sampling locations for PRSs 16-031(d) and C-16-065 near TA-16-



ROUTES TO MEDICAL SERVICES

13.0 RECORD KEEPING

In addition to Record keeping requirements of Section 13 of the HASP, the HS records specified below shall be completed in accordance with Section 13 of the HASP and kept onsite as indicated below.

TABLE 13-1
RECORD KEEPING REQUIREMENTS

Record/Form	Requirement Reference	Keep Onsite
HASP	HASP Section 1	X
This SSHASP	HASP Section 1	X
Completed SSHASP Modification Forms	HASP Section 1	X
SSO Daily Logbook	HASP Section 13.1	X
Documentation of Training	HASP Section 10	
Documentation of Medical Surveillance	HASP Section 11	
Exposure Monitoring Records	HASP Section 6	X
HS Inspection Records	HASP Section 12.1	X
Documentation of Daily Calibration	HASP Section 6	X
Documentation of Equipment Maintenance	HASP Section 6	X
Guidance Manual for Exposure Limits	HASP Section 6	X
Operational Manuals for Monitoring Equipment	HASP Section 6	X
Required Excavation Permit	HASP Section 4.2.2	X

APPENDIX A

MAP(S) OF SITE LOCATIONS

ADJACENT FACILITIES

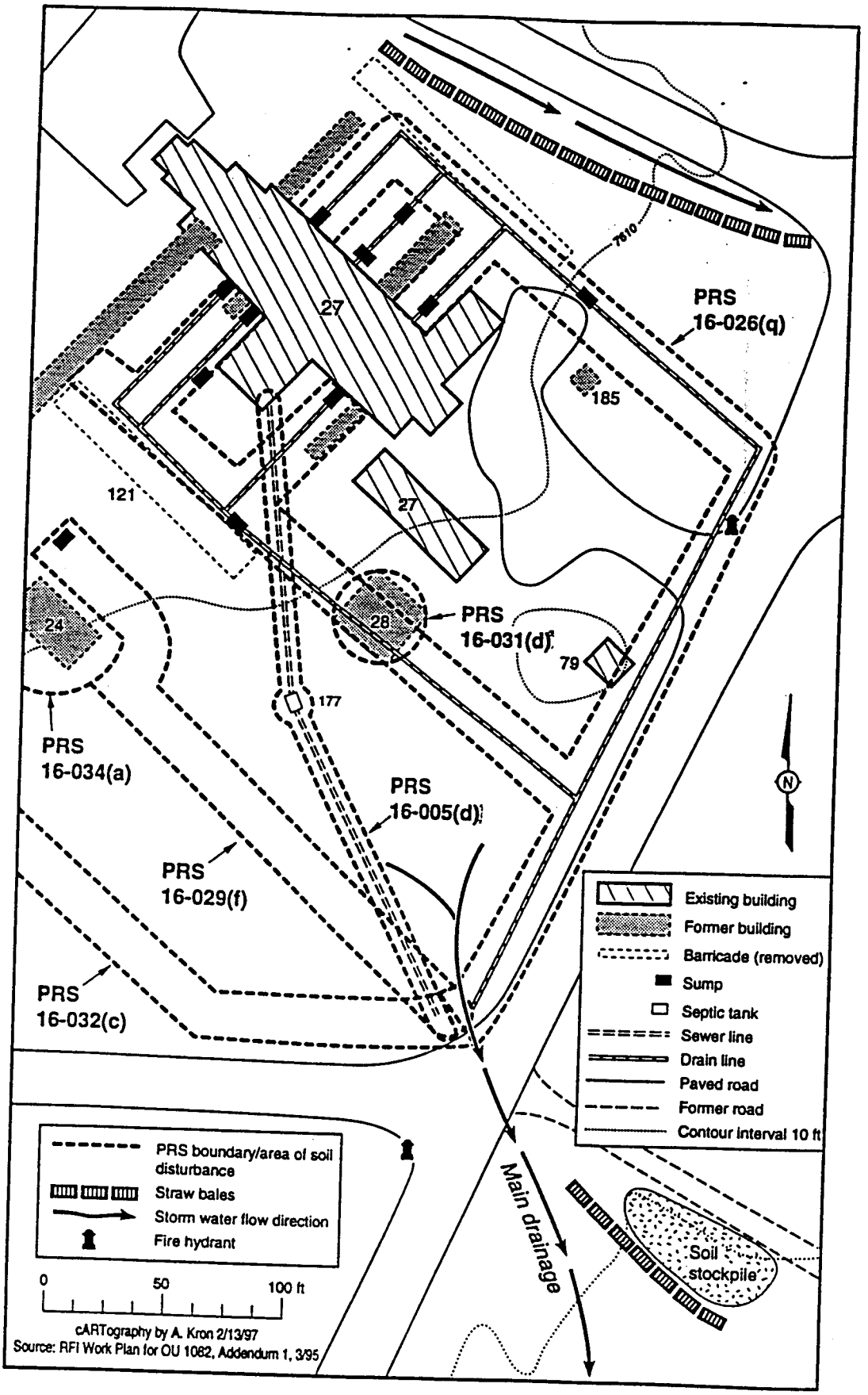


Fig. 3. Locations of Building TA-16-27 and PRSs at GMX-3 central.

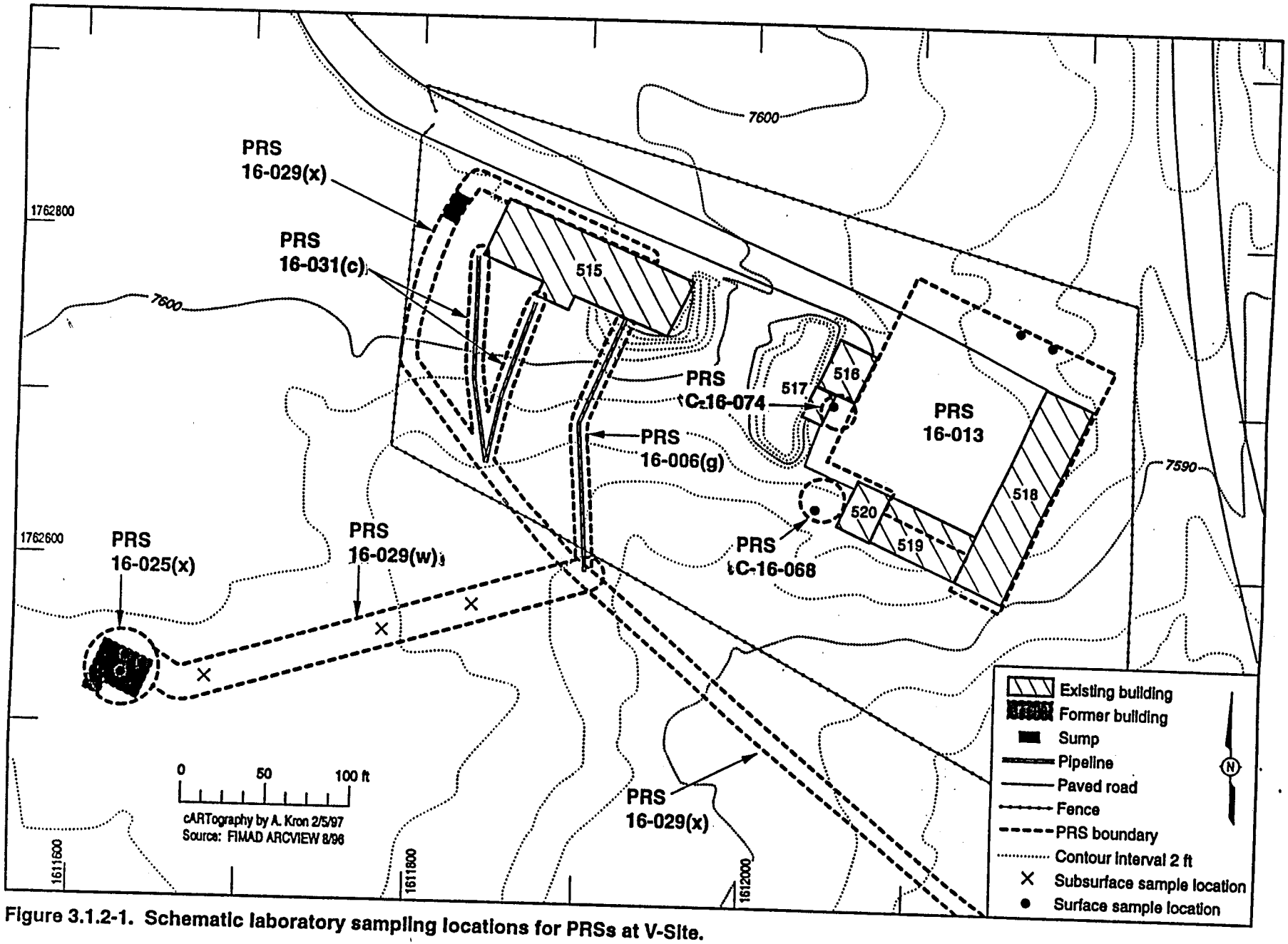


Figure 3.1.2-1. Schematic laboratory sampling locations for PRSs at V-Site.

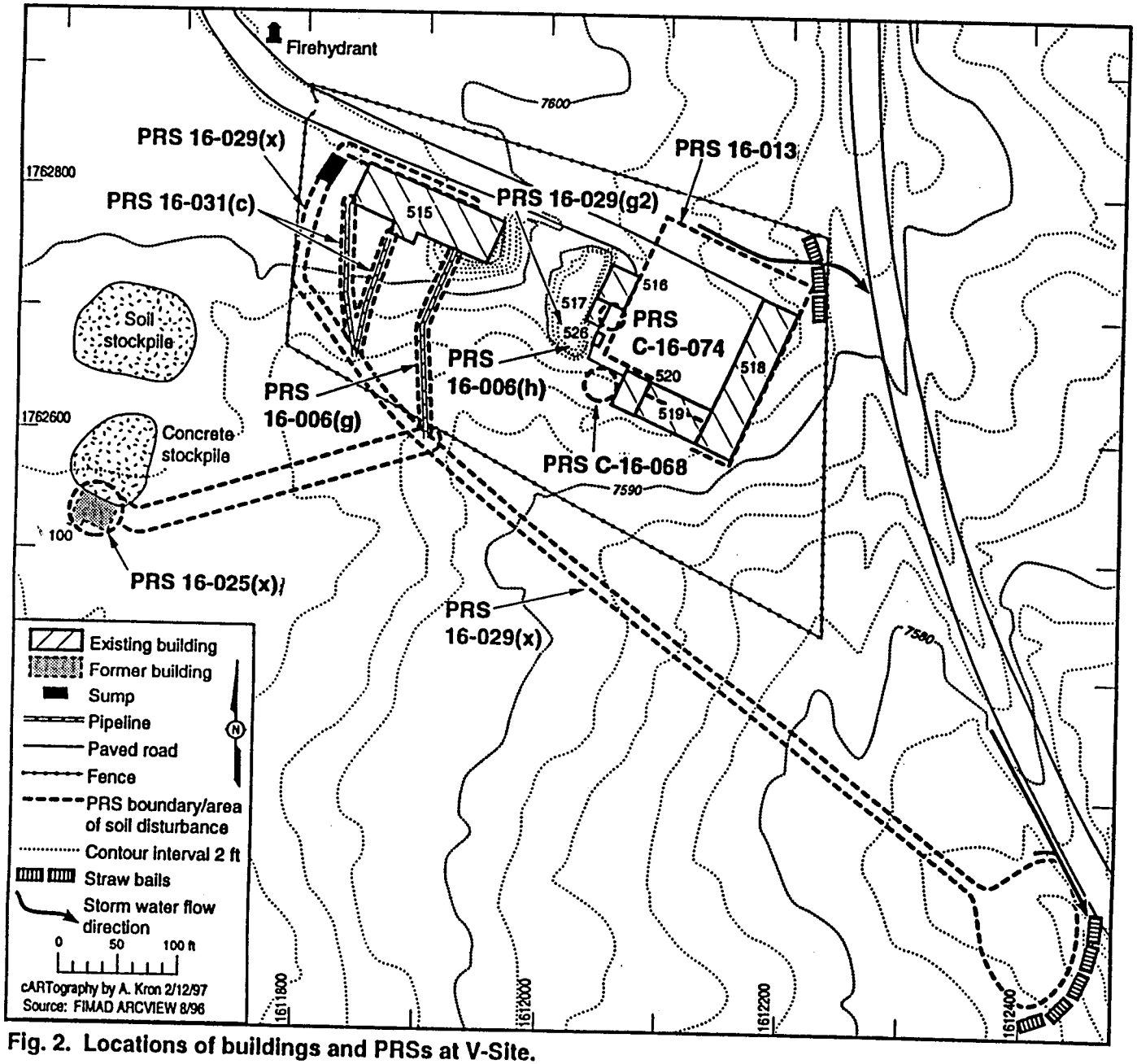


Fig. 2. Locations of buildings and PRSs at V-Site.

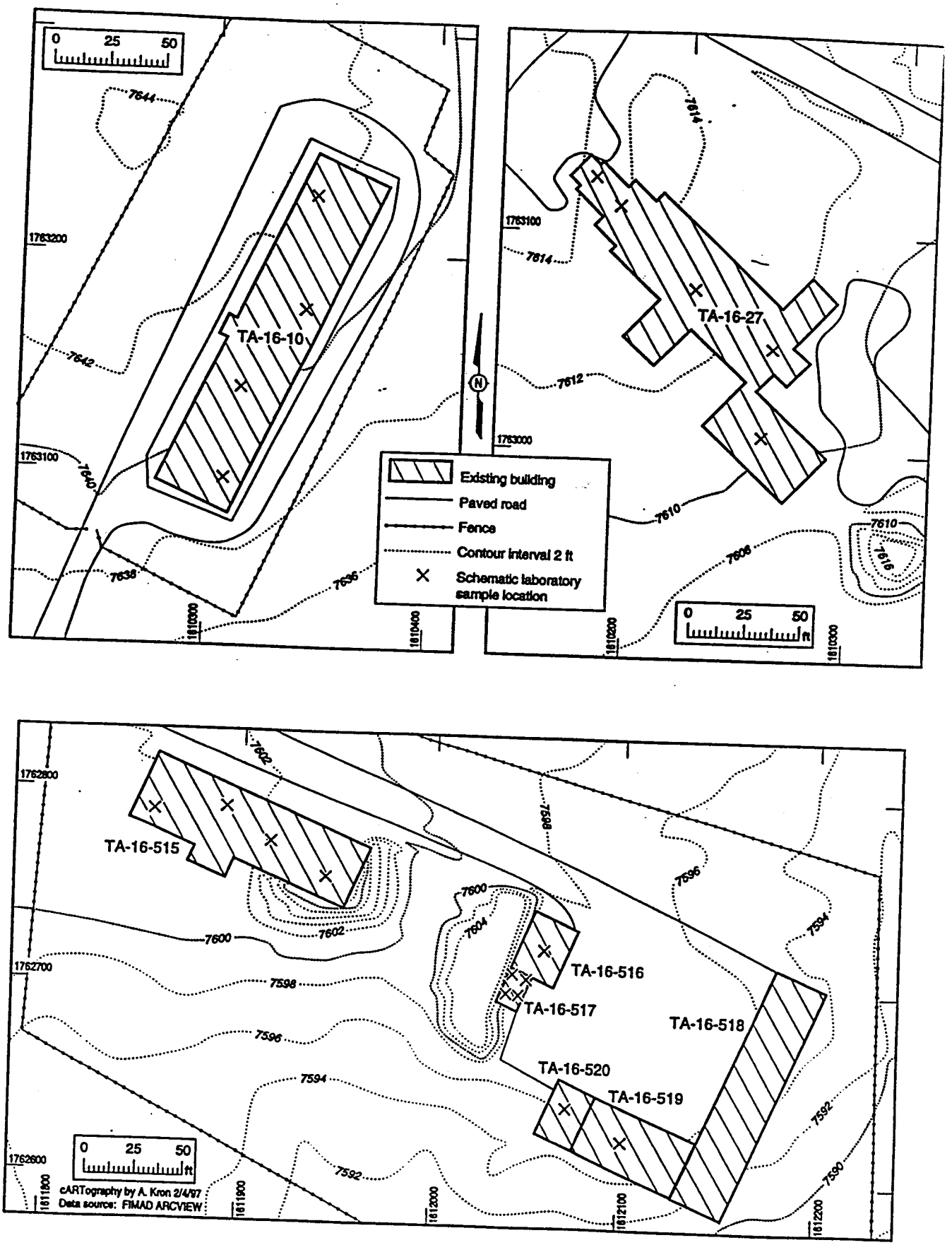


Figure 3.1.2-5. Schematic laboratory sampling locations for PRS 16-017.

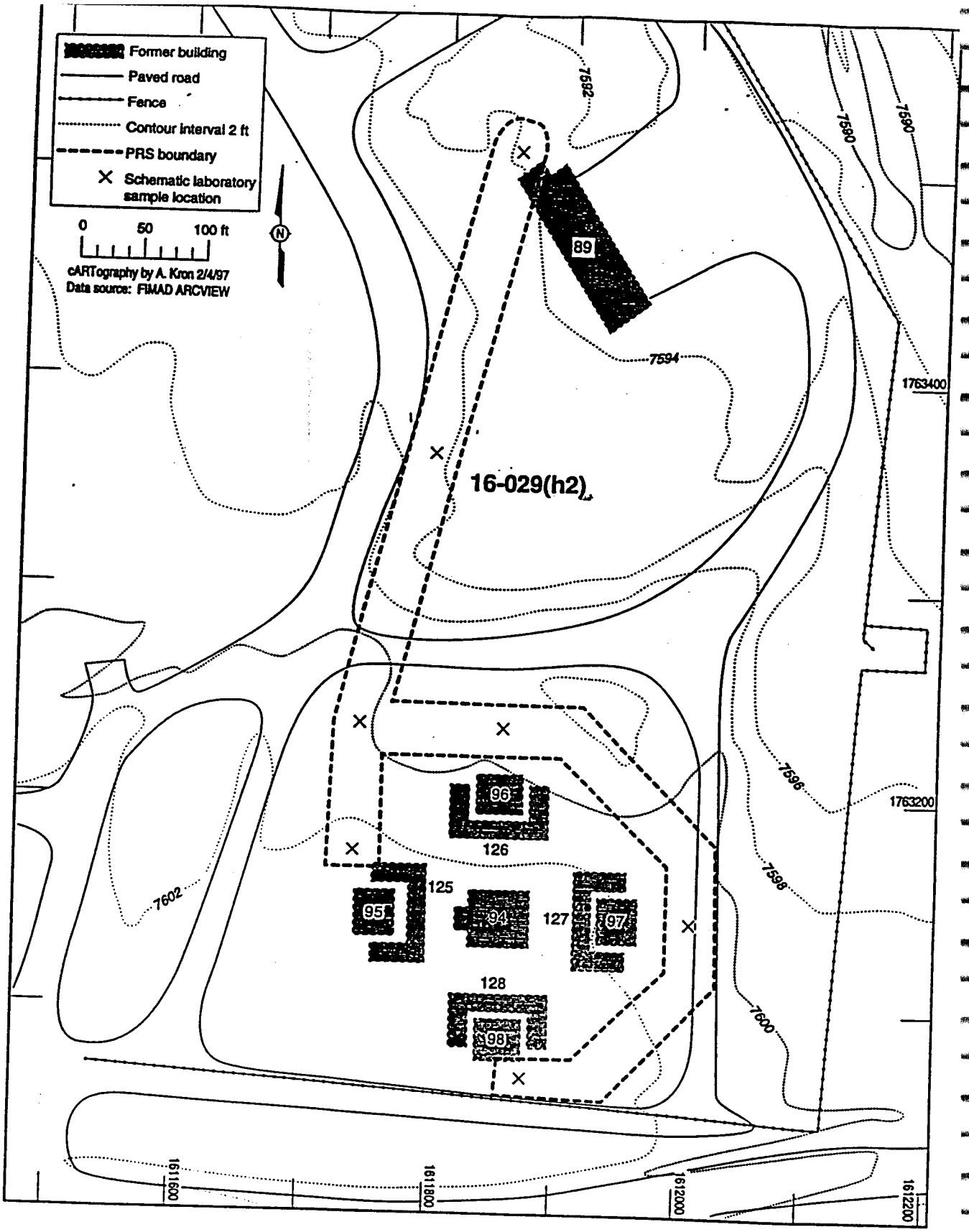


Figure 3.1.2-8. Schematic laboratory sampling locations for PRS 16-029(h2).

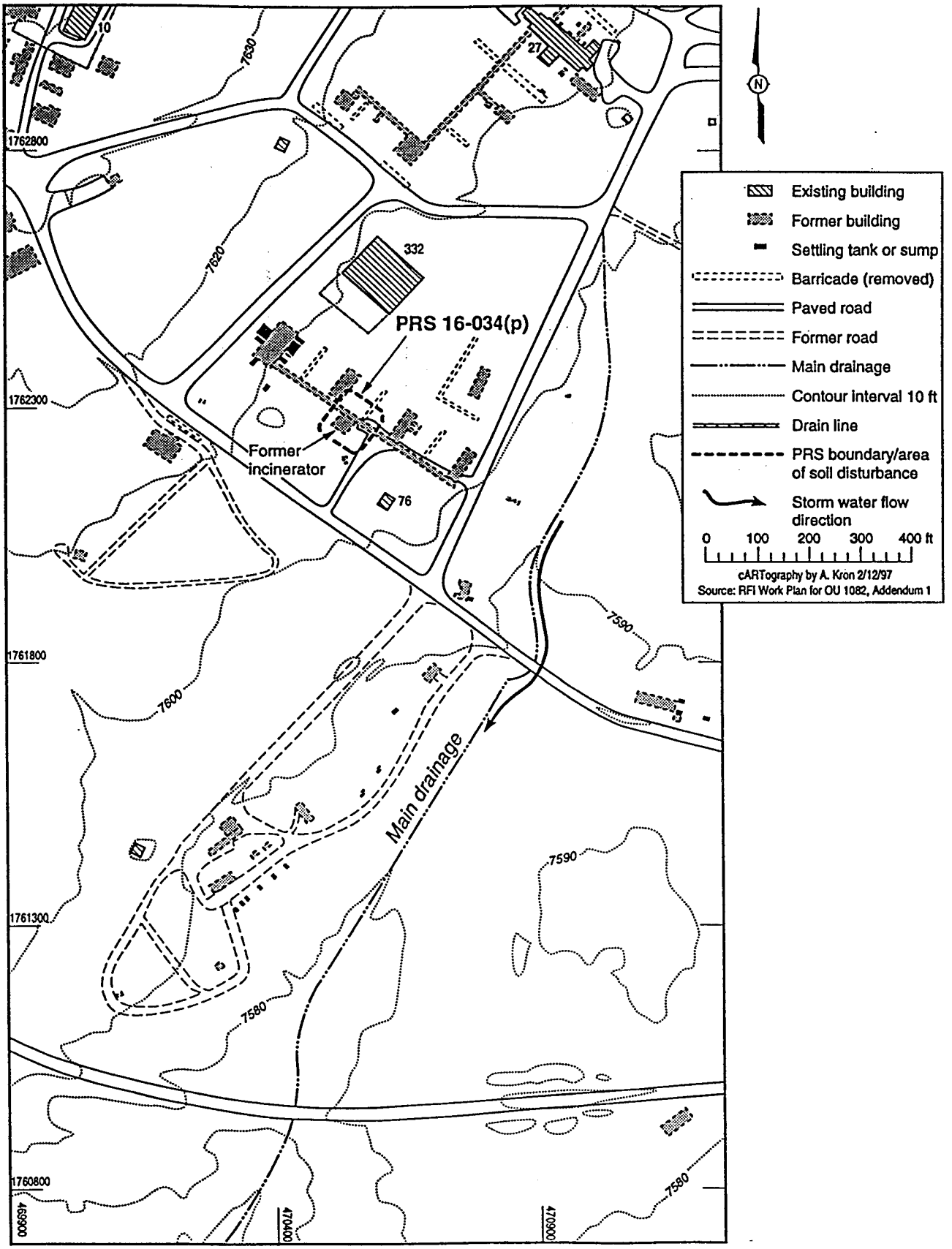


Fig. 5. Location of the main drainage and incinerator at GMX-3.

APPENDIX B

HAZARDOUS SUBSTANCE - HAZARD ASSESSMENT

HAZARD ASSESSMENT OF SUSPECTED CHEMICAL CONTAMINANTS			
Chemical	**Maximum Data**		**Hazard Assessment Rating and Rationale**
	Value	**Location**	
Chemicals Brought to Site			
Isobutylene	N/A	Support Trailer or location of	**Negligible**
Gasoline	N/A	calibration of PID	The probability of a mishap resulting in.
Diesel Fuel	N/A	These substances will be used	overexposure is unlikely to occur but if occurred would
Motor Oil	N/A	throughout the site for maintenance and fueling of	result in a minor injury. These substances shall be used periodically in small quantities. Goggles shall be worn
Lubricant (WD-40)	N/A	motorized vehicles and equipment	when refueling to reduce the probability of a splash to the eyes
HE Spot Test Kit: LANL HE Spot test kit, Ensys kit, and D-Tech kit	N/A	These kits will be used throughout the site for testing soils and equipment for HE.	**Negligible** The probability of a mishap resulting in an overexposure to these chemicals is unlikely to occur, but if occurred, may result in a minor injury. Only small quantities of these chemicals shall be used to test soil for the presence of HE.
Contaminants of Potential Concern			
High Explosives (HE): TNT, RDX HE Degradation Products: Boron, DNB, TNB HE Burn Products	N/A	16-005(d), 16-026(q), 16-031(d), 16-006(g), 16-017, 16-025(x), 16-029(g2), 16-029(h2), 16-029(w), 16-029(x), C-16-065, C-16-068, C-16-074, MD	**Serious** The mishap probability of encountering HE and causing a detonation during excavation activities possibly could occur resulting in a life-threatening injury from the impact of explosion.
Radiological			
Uranium ^{238}	N/A	16-005(d), 16-026(q), 16-013, 16-017, 16-029(x),16-006(g), C-16-068, C-16-074, MD	**Minor** The mishap probability of radiological contamination possibly could occur resulting in a minor exposure.

HAZARD ASSESSMENT OF SUSPECTED CHEMICAL CONTAMINANTS Cont'd			
Chemical	**Maximum Data**		**Hazard Assessment Rating and Rationale**
	Value	**Location**	
Metals			
Metals suspected but specifics not identified in the RFI Work plan (See below for suspect specific metals).	N/A	16-005(d), 16-026(q), 16-031(d), 16-006(h), 16-013, 16-017, 16-029(g2), 16-029(h2), 16-034(p), C-16-065, MD	**Minor** The probability of a mishap resulting in metals exposure possibly could occur resulting in a minor illness/injury.
Barium	N/A	16-025(x), 16-029(w), 16-029(x), C-16-068, C-16-074	**Minor** The mishap probability of exposure to any of these metals possibly could occur. These metals are expected given the history of operations at the site, but they their presence has not been verified. It is assumed that exposure would occur from particulate-producing operations such as drilling or excavation, as the metals may be present in the soil. Dust-suppression techniques shall be practiced to reduce the probability of overexposure and personal samples will be taken to verify if these metals pose a health hazard
Beryllium		16-006(g), 16-025(x), 16-029(w), 16-029(x), 16-031(c), C-16-068, C-16-074	
Cadmium		16-025(x), 16-029(x)	
Chromium		16-025(x), 16-029(x)	
Nickel		16-025(x), 16-029(x)	
Cyanide		16-006(g), 16-025(x), 16-029(w), 16-029(x), 16-031(c), MD	
Lead		16-006(g), 16-025(x), 16-029(w), 16-029(x), 16-034(p), C-16-068, C-16-074	
Silver		16-006(g), 16-025(x), 16-029(w), 16-029(x), 16-031(c)	
Minerals			
Asbestos	N/A	16-006(h)	**Negligible** The crew is not responsible for removing the material. Crew will be instructed to stay away from the asbestos.
Organics (VOCs/SVOCs)			
VOCs suspected but specific chemicals unknown. Possibly from septic systems.	N/A	16-026(q), 16-013, 16-017, 16-025(x), MD	**Negligible** The probability of a mishap from exposure to VOCs and SVOC's is unlikely to occur given expected low concentrations and given that Bldg. 27 has been inactive for~26 years and V-site for 16 years, but if a mishap did occur it most likely would result in a minor injury or illness.
Possible VOCs from varnish/glue operations: Xylene, Ethyl Benzene, Toluene, Trimethyl Benzene, Phenol, Thiophene, Pyridine		16-006(g), 16-029(w), 16-029(x)	
SVOCs suspected but specific chemicals unknown. Possibly from septic systems.		16-006(g), 16-029(w), 16-029(x), MD	
SVOCs Hydraulic Oil		C-16-074	

APPENDIX C

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL

REFERENCE MATERIALS

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL REFERENCE MATERIALS

The following physical, chemical, and toxicological reference materials shall be maintained on-site:

1. NIOSH Pocket Guide to Chemical Hazards.

2. ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.

3. HNu Photoionization Detector Guidance Information

4. Quick Selection Guide to Chemical Protective Clothing

APPENDIX D

EMERGENCY CONTACTS AND ROUTE(S) TO MEDICAL SERVICES

EMERGENCY CONTACTS AND PHONE NUMBERS

(post on-site in Support Zone)

MEDICAL EMERGENCY/FIRE:

Los Alamos Fire Dept. ..... LANL phone: **911** Cellular phone: **667-7080**

HAZARDOUS RELEASE/SPILL/INCIDENT:

LANL HAZMAT Team (EM&R) **667-6211**
LANL Occupational Medicine Clinic (ESH-2) **667-0660**
Los Alamos Medical Center Hospital **662-4201**
Security OS/Pro Force **667-6534**
Los Alamos Police **662-8224**

FACILITY CONTACTS/PROJECT MGT./SUPPORT PERSONNEL:

TA/Facility Manager: **[Dennis Carathers]** **665-8439**
TA-16 Facility Health and Safety : **[Dan Macdonell]** **665-6227/104-6410**
TA-16 Facility HE.: **[Bill McCormick]** **667-6316/104-6704**
FPL: **[Roy Michelotti]** **665-7444/996-1006**
FTM: **[Lynn Kidman]** **661-5227/699-2126**
FTL: **[Linda Fluk]** **661-5229/699-1014**
Field Unit ESH-1 Rep.: **[Marty Peifer]** **661-5229/104-6649**
ESH-5 Rep.: **[Ivan Wachler]** **661-5211/104-6979**
Drilling Support: **[Joe Skalski]** **667-2876/996-0891**
LANL Pager Access Number: **665-9800**

MANAGEMENT CONTACTS:

Employer: ICF Kaiser	Contact: Scott Wimer	**661-5220**
Employer: Morrison Knudsen	Contact: Clark Judy	**662-7300**

EMERGENCY REPORTING INFORMATION:

When calling for emergency services, have the following information available to report:

- Site name/location/phone #
- Caller ID
- Nature of emergency
- Number of personnel involved
- Name and condition of affected employees
- Actions taken and assistance required